

NATURE MAGAZINE

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Goose Beyond the North Wind

By LORENE SQUIRE

Photographs by the Author

HE IS known by many names in the lands he frequents—white brant, wavey, and lesser snow goose and others—but the name that seems to fit him best is that of science, *Chen hyperboreus*—goose beyond the north wind. He comes, this snow goose, late in autumn upon the heels of the first cold gales as though following the north wind from beyond the country of its beginning. His nesting ground lies far to the north upon the edge of the Arctic coast, and his plumage is snowy-white, typical of the creatures in that land of ice and snow.

Though the snow goose is probably the most abundant of all North American geese, he has almost disappeared from the Middle West, where the species was once abundant. During migration this goose now seeks wide stretches of isolated prairie, seldom frequented by man. For centuries his kind sought, in spring and autumn, the solitary grasslands and sloughs of the mid-western plains. Unlike the wild ducks and gray geese, the snow goose has not accustomed himself to the closing in of the grasslands and the coming and going of man about his feeding grounds.

Most ducks and geese remain almost invisible in the greens and browns of their feeding grounds, while the plumage of the snow goose is a gleaming beacon announcing his presence. All that he could do was to retreat before the encroachment of civilization, concentrating his numbers in those regions that man had not completely taken over and becoming ever more shy and suspicious. It is only because of his wary character and his avoidance of closely-settled regions that the snow goose did not follow the fate of that other white game bird of the western plains—the whooping crane.

On the plains of the Middle West, east of the short grass country, scattered, vagrant bands of geese appear where many years ago they came down in such numbers

as to turn the prairie white. These are the few geese that still stubbornly follow the migratory course of their ancestors, refusing to seek safer passage farther west.

Years ago, when the first settlers came into this region, the great bands of geese would allow a man on horseback to come riding into the flock, knocking the birds down with a club, trampling them under the horse's hoofs. Those that now remain will scarcely allow an approach within range of a pair of high-powered binoculars. Now and then a hunter brings in a few out of these scattered flocks after having crawled up on them for about a mile, or used a mystified cow as cover for his approach.

These vagrant bands of geese may sometimes be glimpsed at a great distance upon the autumn fields rising like flakes of wind-blown snow. In autumn they remain for only a short time about their feeding grounds, seeming ever nervously wild, sensing danger even though they are not molested. The hunter may look up from a blind to see a flock of these great white birds winging high out of range, or, when crawling up toward a flock of ducks on the river, he is sometimes astonished to see a flock of white brants rise cackling overhead long before he nears the river's bank.

Often during an entire autumn the presence of these geese is known only by the sound of their clanging calls in the night as they wing their way South. These gabbling, noisy calls have a wild, mysterious, enchanting quality. They suddenly are heard overhead and as suddenly are gone. Stirring, awakening calls they are, speaking of far lands and long wanderings. They bring a swift, compelling vision of wild white geese flying with brave wing strokes through the dark—wanderers taking their age-old course across a continent, undaunted by man's persecution, valiantly braving a barrage of guns awaiting



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them from the Arctic Circle even to the Gulf of Mexico.

During the spring migration a lone snow goose now and then becomes separated from the flock and comes down to rest and feed about a prairie slough waiting for another flock to pass. One such goose came down out of a Kansas wind storm and loitered about a small prairie pond for several weeks; a rugged individualist if ever there was one. Unafraid of man, he completely ignored anyone approaching within a few feet of him. Why this lone snow goose was so unusually tame must remain a mystery. During his winter in the South he may have stayed about some sanctuary where he was not molested. Yet I like to think that he was an unusual character among his kind.

He was a big, pompous bird. He waddled across the wheat fields as though he owned them, keeping a haughty eye toward the skies while feeding, ignoring the small flocks of teal and spoonbills that, too, came down upon the prairie slough.

Now and then he mounted into the air on proud, wide pinions, rising ever higher and higher until he disappeared from sight, the faint echo of his clanging cries drifting down as he mounted toward the pinnacle of his flight. He may have taken these flights merely to exercise his wings or to search for other snow geese in the April skies. As far as I knew all the geese had flown north that year and there would be no more ranks of great white birds winging past.

He came down out of the skies like a white-sailed ship, his great wings banked, his long neck outstretched, his snowy plumage gleaming in the April sun. When he landed upon the slough he disturbed the water's surface

no more than the small teal landing. He seemed to take a positive pride in his graceful skill, maneuvering deftly over the pond before he settled down.

When he came down on the wheat field he touched the ground as lightly as a thistledown. For a moment he would stand with his white, black-tipped wings arched over his back in the manner typical of alighting snipe. These beautiful arched wings gave the snow goose a seraphic appearance—his wings reminding one of those seen on angels in church windows. But this illusion was quickly lost when he folded his pinions and waddled off about his feeding.

The feathers upon his head and neck had a reddish tint; his beak was carmine red; his feet and legs dark red. On his wings were bands of gray blue, visible only in flight. These wing patches were the only indications of the thick undercovering of blue-gray down beneath the goose's white plumage.

He followed out the usual feeding hours of wild geese, eating all morning, coming down to the slough about noon, and then going back to the fields by mid-afternoon. He continued his grazing until near sunset when he would dabble about the water's surface for a short time and then return to the field near the pond. Here he could be seen busily plucking off wheat shoots long after the first stars were visible in the sky. I don't suppose he could have eaten through the night but he may have. He had an enormous appetite and that mainly for green wheat. The farmer who owned the place was of the opinion that, given time, the white brant would eat the entire year's wheat crop, and he may have been right.

The gray coyote upon his rounds found the snow goose

more than a match for his crafty designs. At sight of a wolfish, skulking form in the tall grass along a wheat field the snow goose would waddle off toward the center of the field, or wing down to the slough. Since the goose spent his nights in an open field it is something of a mystery that he did not fall prey to the coyote's stealthy approach under cover of the darkness. Finally, the coyote more or less gave up stalking the goose as a hopeless business and trotted across the wheat field in plain view, as if such an old fellow would not so much as dream of slipping up on a goose from cover. The goose, not entirely convinced by the coyote's air of philosophic indifference, would edge thoughtfully off, regarding the coyote with a wary eye. These two were ancient enemies. For centuries the prairie coyotes must have reaped a fine harvest in spring and autumn from the vast bands of snow geese settling down on the grassy plains. Sometimes at dusk the bark and wail of the coyote floated over the fields, but this eerie sound did not once cause the snow goose to pause in his endless feeding.

The big white bird waddled majestically among the flocks of crows that settled upon the wheat field, calmly indifferent to the raucous arguments and discussions going on among the black-feathered tribe. At dusk, the jack rabbits in shadowy, long-eared outlines came out upon the wheat field loping past the goose, and the cottontails against the dark background of the field appeared no more than white, flashing tails twinkling around his white silhouette. The blackbirds with scarlet wing shoul-

ders swung over the snow goose as he floated beneath the overhanging willows of the pond. When he waded through the tall slough grass hunting frogs, he now and then brushed against the nests of the red-wings. This caused a great deal of fussing and scolding and chattering up and down the shore, all of which the snow goose ignored. A marsh hawk dipping down toward him over the surface of the slough did not even cause the goose to raise his head. And he was no more disturbed by the few fishermen who came to angle for sun perch and catfish through the drowsy spring afternoons. He was known to swim up and inspect a floating cork dropped near him by some fisherman and then to paddle calmly off, satisfied that the cork was of no interest to him.

Through the golden, sunlit days of April and May he remained about the small prairie pond, growing fat from the wheat; a tranquil, happy, self-satisfied bird who had forgotten his heritage of fear that belongs to all wild creatures; quietly content in this prairie sanctuary. Only the sound of a gun would disturb the goose into short quick flight, and if the gun shots continued he would wing away to return later in the day. He never became accustomed to rabbit hunters banging away at swift bounding jacks in the nearby pasture, but otherwise there was nothing to disturb the even tranquillity of his days—that is, nothing except my attempts to photograph him in flight.

I still remember this snow goose with something like despair. I especially wanted to get photographs showing

"—DOWN OUT OF THE SKIES LIKE A WHITE-SAILED SHIP, HIS GREAT WINGS
BANKED, HIS LONG NECK OUTSTRETCHED—"



him in flight but he would not leave the ground. He soon became accustomed to having me around and would go on calmly feeding while I walked up to within a few feet of him. And then, with pompous dignity, he would waddle off, plucking at spears of wheat as he went. Photographing water birds in flight had always been a problem of approaching near enough, by a devious, elaborate stalk, to get some sort of a picture as they rose in startled alarm into the air. The difficulty with the snow goose was to goad him into unwilling flight. I tried running after him but he could run as fast as I, travelling at a rapid, waddling gait ahead of me, uttering complaining honks over his shoulder while I followed, my face in the focusing hood of the camera, hoping to get a picture if he should rise into the air. When I came to an exhausted standstill the goose returned to his feeding, pausing to look at me thoughtfully and utter a gentle honk as though in reproof. From certain angles, the toothed edges of his beak gave him a peculiar grinning look, and it was something of a shock to note this snow goose regarding me with a wide grin. I decided that whoever first pointed to the goose as an example of stupidity had never known a bird like this. There was a poised, sagacious cock to his head that did not belong to a bird famed for slow-wittedness. I had a troubled feeling that

during the chase around and around the wheat field I appeared a good deal more foolish than the goose. In fact I had no doubt that I did.

I finally had to become resigned to the fact that the snow goose was not going to fly unless he decided to of his own free will. I had to follow him around for days waiting for him to take off of his own accord on his rare flights. I stood in patient attention near the snow goose hour after hour while he went on with his feeding, until one day I happened to be on hand when he lifted his black-tipped pinions and took off from the wheat field. Since this was the hour that he returned to the slough I hurried down to the water's edge and finally, when he sailed down out of the sky, I took several photographs of him as he winged around the slough. These photographs represent more patient time and effort than any flight pictures of wild birds I have ever made.

Finally, in May, the snow goose left the slough, winging his lone way toward his nesting ground in the Arctic Circle. Now in the autumn when wild geese go crying over our small prairie town I wonder if this tame, clever and pompous goose is among them. How has he fared from the guns of hunters? There was something about his self reliant, sagacious air that makes me feel that he has outwitted them and still owns his little bit of sky.

The Platypus

By EDITH M. LAING

ONE OF the queerest creatures in the world is that shown on a stamp of Tasmania. The accompanying picture is an enlarged photograph of that stamp. This creature, which is found only in eastern Australia and Tasmania, is the duck-billed platypus, *Ornithorhynchus anatinus*, a member of the lowest class of mammals—the Monotremata.

With thick, soft fur, a short, broad tail, a very broad bill-like mouth and short legs with webbed feet, it looks like a queer mixture of duck and beaver.

The platypus is an accomplished diver and a powerful swimmer. It feeds on worms, snails and water insects. The home is a burrow in the bank of a stream, the entrance being above the surface of the water. Since the burrow is dug only as a home for the prospective young, the work is done by the female alone. She works energetically, using only the forefeet for the more difficult labor, but the horny lips or "bill" as an aid in removing the loosened earth. The displaced soil is impacted by the digger, which uses the powerful hind feet for this purpose, and packs it against the sides of the excavation, which has been made wider than necessary

with this end in view. Thus no heap of earth remains to betray the presence of the home. The animal selects a clay bank to insure that the burrow will not cave in, avoiding sand and gravel.



The burrow rises gradually from the entrance, and ordinarily may be fifteen or twenty feet in length. However, it is renewed from year to year, and from various causes the mother may decide to make it longer. In one case, recorded by Mr. Burrell, who has studied the creature long and carefully, where the burrows of other species intervened (which the platypus uses great care to avoid) a hole traversed upwards of one hundred feet, a considerable

task of excavation for the animal.

At the extremity of the burrow the mother prepares a nest for the reception of the eggs. In its preparation she uses grass-stems, leaves, rootlets, rushes and other handy material. This is shredded to make a soft lining. Two eggs are laid, and there is evidence that the female plugs herself in for some time during incubation, and while the helpless young are nursed. Occasionally she must leave the burrow for food and at such times she prudently replaces the plugged exit for safety.

Plumes of the Forest

By E. E. STANFORD

DO YOU know the fronded evergreens—the plumed knights and the feather-decked ladies of the forest? There are many of them; the junipers, the red cedars, the white cedars, the true cypresses, and various others. They are not distantly related to the needle-leaved conifers—the pines, the spruces, and the like. They show their kinship, too, by starting out as seedlings with sharp swords or daggers like those of their more truculent relatives. But, as though they found themselves in a more pacific world than they had been led to expect, most of them presently shed their weapons of warfare and proceed to cover themselves, prudently if pacifically, in suits of green mail, of thousands and millions of tiny leaflets overlapping and scale-like, surpassing in delicacy of workmanship the finest efforts of medieval smiths who clad warriors of the Crusades in flexible armor. Some of them, such as the junipers, retain sharp, knightly weapons, as well as scales; young sprouts and sprouts from wounds, in particular, are likely to rush out with daggers. But the gentler members of the group, such as the graceful, drooping Port Orford cedar, seem to have thrown away all appearance of truculence. Their fern-like, feathery fronds mark them as the ladies of the family.

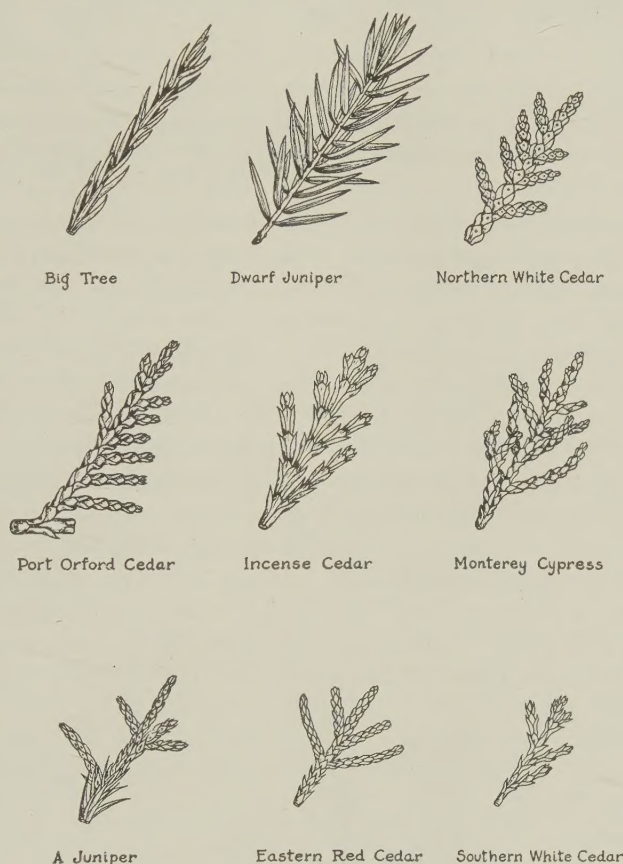
If we turn from fancy to fact, and from metaphor to English unadorned, we can find more actual justification for the scale-armor of the fronded conifers. Plant forms—and animal forms, too—have been shaped by a complex of forces. There is the tendency of ancestral repetition we call heredity.

There is the urgent, if sometimes infinitely slow, progress-tendency of evolution, which shapes diverse forms from a common ancestry. And there is the effect of age-after-age-long impingement of the environment upon plastic living substance. Just how much of plant form, of scale-armor development, or of any other peculiarity, is due to the inherent nature of the organism and how much to the long-time influence of surroundings, we can hardly tell. But we do know that the whole form of a plant—the shape of its leaves, the mass of its trunk, the ramifications of its roots—must adjust the living mechanism to

its environment. If it did not, some other plant-kind probably would be growing in its place. The sharp points of junipers and the pungent bitterness of their fronds may discourage browsing animals. But the scale-armor is conservative rather than defensive; it is means of life as well as protection of life. It lets through sunlight energy for food-manufacture, carbon dioxide for building material, yet tenaciously conserves the precious water on which all life depends. It is the scale-armor that enables the juniper or its relative to go on living among granite rocks on scanty soil in cold arid situations where the growing season is brief, where drying winds beat unceasingly. As for swamp and bog plants like the white cedars, which often

grow, as it were, with their feet in water, such a retentive jacketing of branches may seem unnecessary. But for various obscure reasons that we cannot detail here, the water of bogs is generally quite difficult for plants to get and utilize, even though they grow with their roots in it. So the fronds of swamp cedars also are practical as well as beautiful.

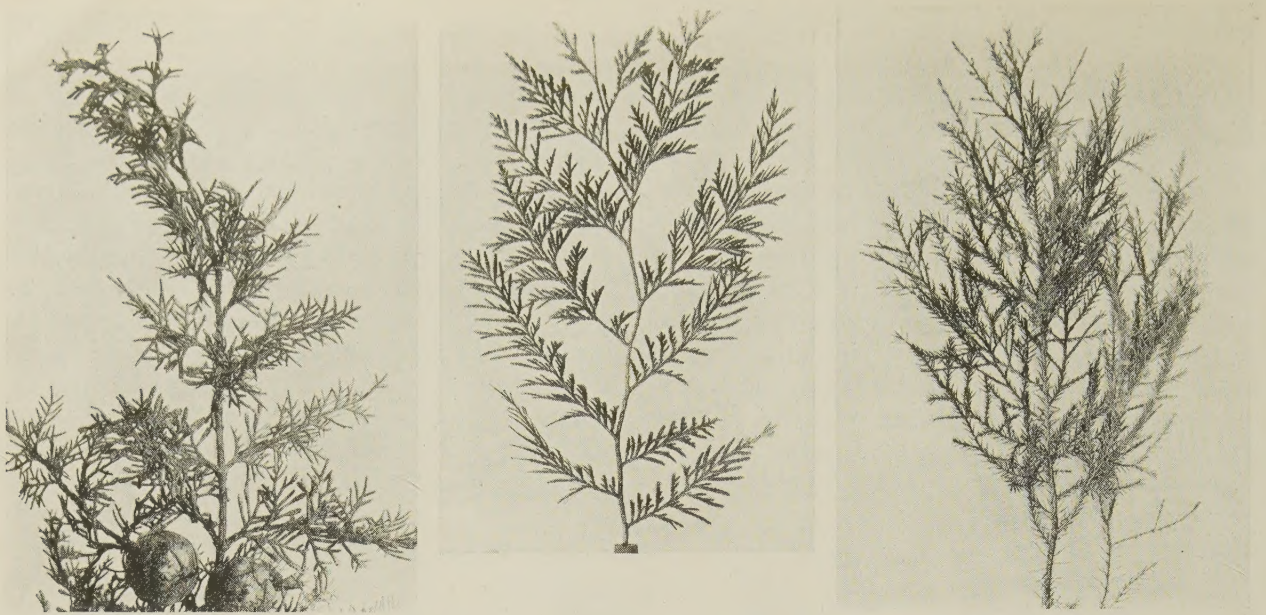
Scale leaves are tiny things, a fraction of an inch long at most. They are borne in pairs or trios, less commonly in fours, clasped so closely on the slender dividing branchlets that the young fronds seem to have no bark at all. Each leaf, small though it may be, is a mass of thousands of smaller things—microscopic living cells, each of which has its uses in this practical business of stem-shingling. Tiny colorless waxy cells shield the surface, letting through the



BRANCH TIPS OF EVERGREENS

These overlapping scale-like leaves retard loss of moisture but admit carbon dioxide. Drawings by E. L. Spuller

light, but retarding as much as possible the loss of precious water. The water nevertheless escapes slowly as vapor through openings—stomata—which have to be there to let in carbon dioxide from the air, as needful as water or sunlight-power in the factories of the plant—for these scale leaves are factories. Within this outer investment, the bulk of leaf tissue is of rather irregular cells in which tiny nearly globular green bodies—chloroplasts—manufacture the sugars and starches later to be changed into the substance of wood, bark and leaf. There are also centrally-located cells detailed to transportation, to the



FIVE DIFFERENT TYPES OF FOREST PLUMES

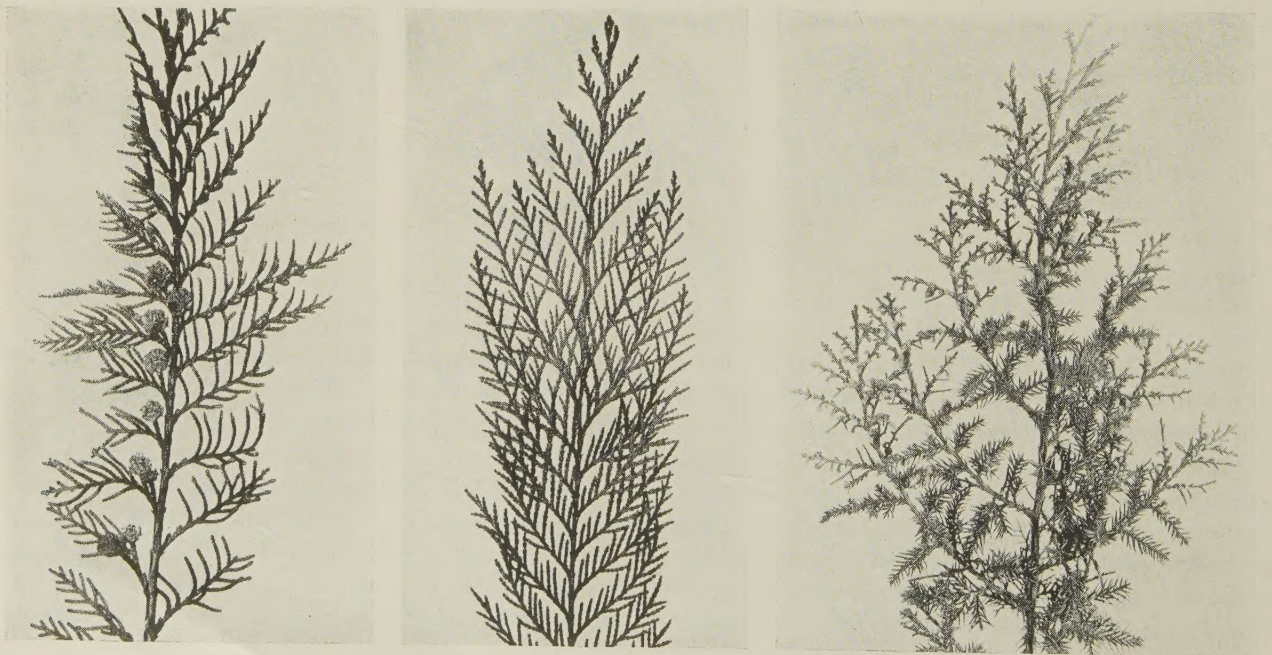
Above, the branch and ball-like cones of the cypress, the western red cedar and the spiny branches of the eastern red cedar. Below, the Port Orford cedar with its tiny brown cones, a leafier silhouette of the same species and the prickly spines of the juniper

bringing in of water that courses leafward from the roots, and to the carrying off of the starch and sugar for which such a compact little manufactory has not storage room within itself. Rather generally, also, there is another cellular structure—a gland in which is secreted an aromatic oil, pleasant to human sensibilities, but repellent to insects and browsing animals. The oil is usually similar to the scented substance of the wood that keeps the moths out of the "cedar chest." This gland is often quite bulky, but may be so deeply buried in the tissues as to be invisible from the outside.

Can these scale-leaved conifers be distinguished through their foliage? To some extent; by an expert, with considerable accuracy. Better look at the cones if you can find them, for in these striking dissimilarities appear. But cones

are seasonal in their development, and often missing when one rambles in the woods; young trees, furthermore, often do not produce them. Of our native scale-leaves—we had better stick to these, for exotics of parks and planted grounds are still more confusing—there are some that can be identified with considerable certainty by their leaves. Others are not so easily identified.

Beginning with the near-needled kinds, there is the big tree of the Sierras of California, with short awl-like blue-green or dull green leaves. Its near relative, the redwood of the coastal fog-belt, is not exposed to the scorching drought of the mid-Sierra, and thus can come out freely in broad needles without risk of water-loss. At the other end of the conifer size-scale from these "largest and oldest living things" stands the dwarf juniper, found on barrens



and alpine heights from Greenland and Labrador to Pennsylvania, Nebraska and New Mexico. This bears real daggers, and need not be mentioned among the scale-leaves save for its close relationship to other junipers, shown by the dull blue berry-like fruit that so clearly sets all juniper-kind off from other scale-leaved conifers, which bear dry brown cones. Of these other junipers, there are nearly a dozen, including the eastern red cedar of the cedar chest. Generally, these have both bristly-sharp awl-like leaves and shorter and sharper scales, which are likely to be arranged three at a node; whereas those of other scale-leaved conifers commonly come in pairs. Juniper fronds are generally easier to look at than to handle, as they are like rough, bristly cords that branch irregularly in various planes; those of most of their relatives, save the cypresses, tend to spread in flattened formations. But if you want to be sure of your juniper, look for the aromatic, berry-like fruit.

The northern white cedar, or arbor vitae, is common in swamps from New Brunswick to Manitoba and southward in the northern belt of our States. It is a ragged-barked tree whose leaves are strongly glandular on the back. It is a variable thing, and runs the Port Orford cedar a fairly good second in "nurserymen's varieties" for home and park plantings. Its closest native relative is the western red cedar, giant cedar, or canoe cedar, *Thuja plicata*, of the Pacific Northwest. The thinness of the flattened fronds of this cedar is most striking; they seem as though cut from thin tough cardboard or leather. They are brilliantly green and branch mostly toward the tip of the branchlets. As the scales shingle the twigs, so the wood of the western red cedar shingles hundreds of thousands, perhaps millions, of American roofs.

Similarly asymmetric are the fern-like flattened fronds of the Port Orford cedar, *Chamaecyparis lawsoniana*, found only in a thumbnail of territory from northern California into southern Oregon. The Port Orford is the nurseryman's darling, though not so adaptable to eastern conditions as the northern white cedar. The mountain hemlock of Pacific slopes was long ago nominated as America's most beautiful conifer, but among the "feather-

ed ladies" of the scale-leaved the Port Orford cedar is incomparable. Its relative, the southern white cedar, *C. thyoides*, ranges from the swamps of southern Maine to the Gulf Coast; it has bristly-scaly fronds with sharp points. It is less showy than the Port Orford, but Dr. Britton, an authority on our tree flora, described the southern white cedar as "probably the most beautiful of our eastern cone-bearing trees," and I feel no urge to refute him.

A famous westerner is the Sierran incense cedar, *Libocedrus decurrens*, whose fragrant wood is beginning to replace the diminishing eastern red cedar in pencils and even in cedar chests. In size, it probably ranks second to the western red cedar among the plumed conifers. Incense cedar leaves are the longest of scale-kinds, forming in whorls of four. Much of their length is closely appressed to the branch, which thus takes on a somewhat jointed appearance. The fronds curve gracefully, somewhat in the fashion of propeller blades. Usually they are dull green, but sometimes take on a golden hue.

Most cordlike of all are the closely-scaled branchlets of the Monterey and other true cypresses, *Cupressus*; they forsake the flattened habit and branch in divers directions. These are not relatives of the deciduous bald cypress of southern swamps, which also has a scale-leaved variety, but are kin to the Italian cypress, and to the funeral or mourning cypress of cemeteries, which is of Chinese origin. They are interesting trees, whose knobby, long-held cones distinguish them most strikingly from the smaller, less woody ones of the rest of the scale-leaved tribe. They are survivors, seemingly of a distant past, of a group that for one reason or another has fallen backward in plant-competition. Most noted for its gnarled beauty of seaside growth, the Monterey cypress has spread far in cultivation from its scattering last stand about the old Spanish capital of California. Other cypresses, the Gowen cypress, and the Macnab cypress, are even more limited in their wildness. Only the interest of scientists and plant lovers, probably, can long keep them from extinction in a world where water-retention is not the only problem of armored conifers.

The Tomato Can Home

By GRACE WHEAT

THE TALE of the old woman who lived in the shoe is only a fable, but here is a true story of the two meadowlarks who lived in a tomato can. These two clever birds apparently did not care to go to the trouble of building their usual grass-covered nest in the open, but looked around until they found a made-to-order home. The tomato can, it seems, was admirably suited to their needs, so they immediately began housekeeping, secure under their tin roof from torrential summer rains.



Tourmaline

*An interesting gem that is beautiful
as well as economically useful*

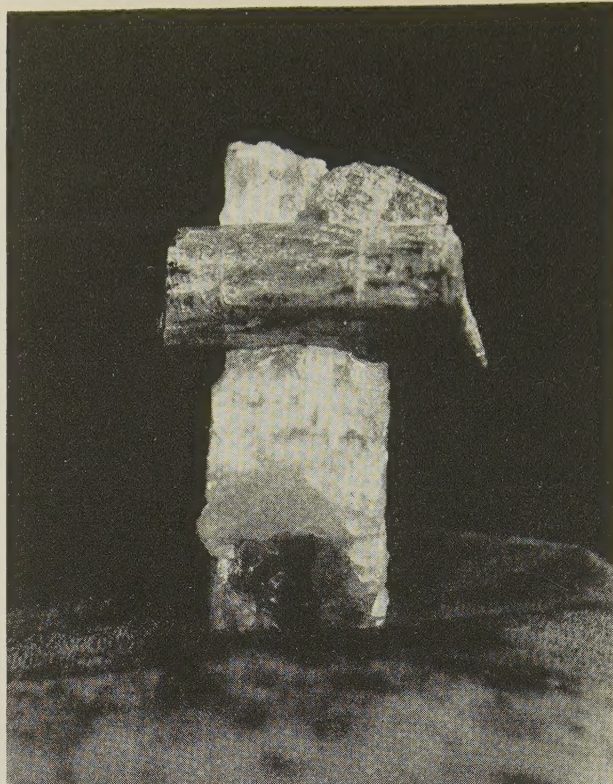
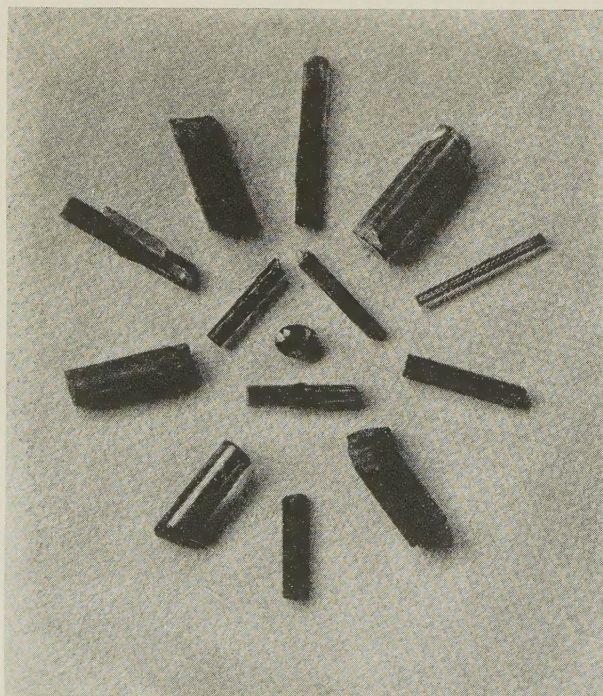
By BERNHARDT WUENSCH

Illustrations by the Author

ABOUT the year 1703 the gem market in Amsterdam, Holland, received a parcel of rough gem material among which were some stones that were cast aside as being too soft for cutting gems. This supposedly soft gem was really tourmaline but was not recognized. At this time only cut stones of this material were received from Ceylon. These were called *schorl* or *turamali*—the Singhalese name. The Singhalese jewelers had erroneously applied the name *turamali* to this stone, believing it to be zircon.

In later years it attracted the attention of mineralogists because of its magnetic powers. When rubbed, the stone picked up particles of peat ashes, and consequently came to be known as *aschentrecher* or ash-drawer. At this time *schorl* and *turamali* were thought to be different stones, but investigation showed that they were the same. For this reason the falsely applied name of *turamali* remained, and constant use has changed it to tourmaline.

Tourmaline is slightly harder than quartz. It exists in long or short prisms, the cross section of which is triangular with a tendency to curve outward. The colors range from pink to green and black. More rarely the colors are blue, dark red, and it is sometimes colorless. The bicolored gems of pink and green are especially beauti-



UNCUT TOURMALINE

It occurs in many parts of the world, California and Maine being the chief production centers in the United States

ful. Sometimes the dark green tourmaline from Brazil, which country has named this gem its national stone, is called Brazilian emerald. The crystals are usually found in granite, gneiss or limestone and are worked out with difficulty. Thus a large tourmaline of gem quality becomes valuable.

Fine gems of tourmaline are produced in many parts of the United States; California and Maine are notable tourmaline sections. Its presence in Maine was accidentally discovered by two amateur geologists, E. L. Hamlin and E. Holmes. Returning from a collecting trip during the winter of 1820, they found a glittering crystal at the base of a tree. It turned out to be a tourmaline of gem quality. They returned to the spot the next spring and found many more. Later this area was worked systematically, and approximately fifty thousand dollars' worth of gems was taken from the rock.

Tourmaline is one of the few gems used in the industries. It is used primarily in the radio industry, where it plays a small but important part. It is also used in tourmaline tongs, in measuring the intensity of radium emanations, and in optical work.

This semi-precious stone has no ancient folklore, but in the early 18th century, when the stone was first introduced to Europe, it was mounted in jewelry to symbolize faith and charity. According to the superstitious, a dream of tourmaline foretells an accident.

TOURMALINE CRYSTALS

One of these, found at the base of a tree in Maine in 1820, led to the discovery of \$50,000 worth of the gems in that area

Fungiphobia

By WENDELL F. OLIVER

IF YOU haven't contracted "fungiphobia" you have missed something. I was exposed to it some thirty years ago when, as a grammar school boy, I went on a "mushroom walk" with a New England horticultural society and saw for the first time the beauty of those humble denizens of the forest floor. The germ remained in a state of suspended animation until a year ago this past autumn, when my daughter and I, roaming an eastern Pennsylvania woodland, came upon the blue, viscid cap of the *Cortinarius ioides*. From that moment the study of fungi became a major pastime, and each Sunday's basket of specimens provided several evenings of intensive study in identification.

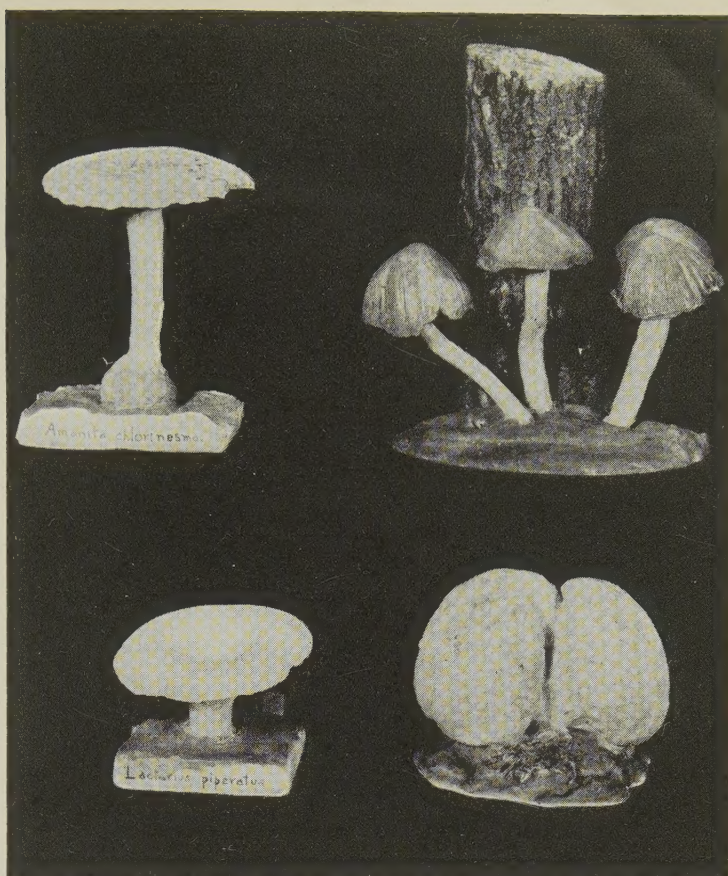
But the study of such an intricate subject needs more than memory and word pictures to perpetuate the knowledge gained from season to season. Divers means of making an herbarium collection by drying and mounting thin cross-sections are recommended in books, but most dried mushrooms lose so much of their character as to be virtually useless.

One day we conceived the idea of modelling the identified species in plaster-of-paris and of coloring these models as accurately as possible. Acting on this idea, we developed a new and fascinating hobby.

The study of fungi is an intriguing enterprise. It takes one on lovely walks into the damp, woodland recesses where grow the gums and the hornbeams, the azaleas and the pepperbush, where the ground is carpeted with resilient mosses, and where the songs of the birds provide a background of melody for the forest sights and smells. It sharpens one's wits to determine the varieties gathered; to separate one species from another. And the modelling and coloring develop an artistic sense that may have been a latent, unknown talent.

The gilled mushrooms are the largest group with which one has to deal, and the varieties are legion. In delicacy of structure they stand apart, and many are of great beauty in the coloration of their caps.

Identification requires the correct answering of a host of questions—the color of the cap or the general form do not always, or often—furnish conclusive proof. They must be noted, however, together with the habitat. The shape of the stem, whether solid, stuffed or hollow, whether or not concurrent with the cap, and whether or not decorated with the remnants of the partial veil, may yield important clues. Then there is the form of the gills and the texture as well as the dryness or viscosity of the cap to be considered before positive identification is possible.



FUNGIPHOBIA, A NEW HOBBY

Modelling of specimens in plaster-of-paris results in a lasting preservation of the subject

But even the answers to all these questions may not provide the correct name, for some varieties closely resemble others except in one character—the color of the spores. A large group of species have white spores, other groups show varying shades of yellow and brown; others, purple or black. A cap, laid gills down on paper, will soon drop enough spores to indicate their color, and this spore-dropping provides an opportunity for an interesting companion exhibit to accompany each model—that of a spore print.

To make a spore print select a perfect cap and remove the stem. Lay the cap, gills down, on a card, black if the spores are white, otherwise upon a white card, and cover with a cup or bowl to shut out air currents. The spores, dropping perpendicularly, soon register the design of the gill structure on the card, and will be permanently "fixed" if the card has previously been treated with gum arabic, one-eighth ounce to one pint of water, and allowed to dry. The moisture from the cap will soften the gum arabic enough to catch and hold the spores.

Having finally determined upon the species, if models are to be made, select a good specimen, or if the variety is gregarious, several specimens of different sizes and stages of development. Remove the stems from the caps and sink the latter top down into wet plaster-of-paris, flush with the rim. Recline the stem half its thickness in the plaster. When this is "set" brush the top surface of the mold with soap and pour on enough plaster com-

pletely to cover the specimen. This completes the mold.

If the gills are very fragile it may be best slowly to precipitate the plaster in water between them, otherwise they may bend unduly under the weight of the plaster. As a matter of fact, it is difficult in many cases to get a really accurate gill impression, and the sketchiness of this feature may have to be supplemented by a word description or drawing of the gill characteristics. The Boleti, with their tubes, rather than gills, and the puff-balls, are easier to model accurately than the gilled types.

When the molds are set, they are pried apart and the specimen is removed. The mold is then thoroughly soaped and after the upper and lower forms have been filled with plaster they are pressed firmly together, the excess plaster being squeezed out.

When the plaster has hardened, the mold is again pried apart and one section usually comes loose from the model without difficulty. It is often necessary to split the other section of the mold by a sharp blow completely to extricate the model.

Any unevenness on the cap or stem is removed with emery-cloth and the gills are accentuated by tracing them out with a sharp, thin blade. Stem and cap are joined

with cement, covered with a wash of plaster and the individual or group is set into a plaster base.

In coloring, oil is presumed to be best, as water colors are reputed to be affected by the lime in the plaster. To the amateur, water coloring may seem less involved than dabbling in oil, and he may find, at least at first that his hand in the former is more accurate and the immediate results are more pleasing.

The writer does not presume to have reached perfection in the development of his avocation and anticipates much better results than thus far achieved as he carries on through succeeding seasons. He is aware that the hand trained in the use of wax can reproduce with much more fidelity the delicate structure of the gills, but time and talent for this method are not within the power of most of us.

To most people the foremost question regarding fungi is their edibility. Their interests are gastronomic, not esthetic. To the Nature student beauty comes first, and after that, when the knowledge of good and evil has developed to the point of certainty, he may indulge his tastes in the delectable dishes achievable from the humble objects of his study.

Where Lurks the Rail

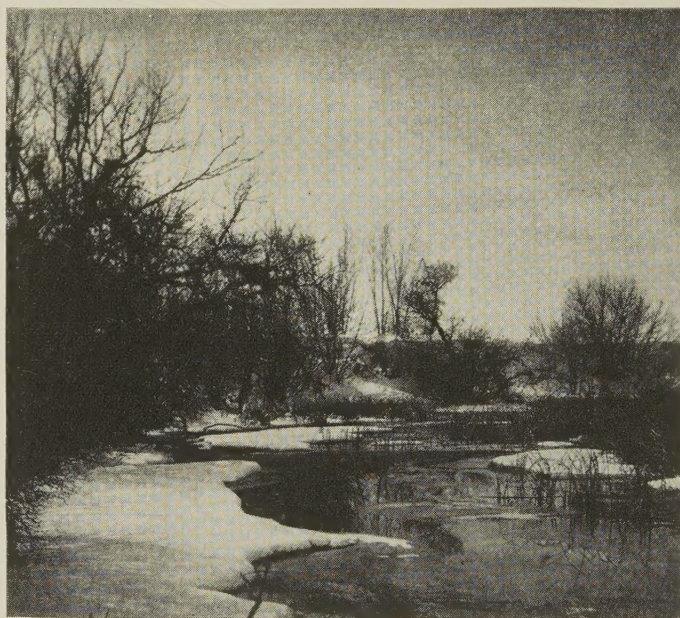
By P. B. PEABODY

AMID the wild reaches of Crook County, Wyoming, a broad stream gushes swiftly from rock-buttressed hills. Furiously dashing down to the lower levels, it calmly meanders among the ranches of "the Land of Beulah". And there, at a curious twist of the landscape, an eternal spring rests beside a little overhanging wooded bank where many nests of birds are found. Here, scattered groups of rushes densely grow among the cresses. In winter the snow-drifts are ever creeping down to the water edges.

The environ is attractive. To the west are rock-fortified cliffs, affording eyrie to a pair of great horned owls that wintered in their tree-claim, nearby. Always, all winter long, I found tracks of a small, dark bird among the rushes bordering the spring, and thrice I caught just a provokingly brief glimpse of the swiftly-passing creature. It was a rail, of course, but of what species?

On a thawy March day again I caught a swift vision of the tiny rail. As I cruised back and forth along the rushes I saw it, for a moment, as it detoured among the growth and disappeared. And then new lines of tracks were found.

To the west of the rushy masses lay a reach of unbroken snow. Beyond this was a single small cluster of tall rushes. This area I had constantly watched; but



IN WINTER THE SNOW-DRIFTS ARE EVER
CREEPING DOWN TO THE WATER EDGES

no rail-tracks had been found, as yet, along the virgin snow. Then, suddenly, I noted that a new trail, with tracks far apart, and pledgets of soft snow lying all along, stretched along the snowy strip. They led to the lone clump, but went no farther. Slowly I tip-toed, close-up. Peering down into the heart of the clump I plainly saw the tell-tale tip of a tail, and the ends of two wings up-reaching into the open space. An eager hand was dashed into the depths; and then—I brought into view a magnificent Virginia rail—the first of its kind ever discovered in Wyoming!

MADAM LYCOSA

By ROBERT SPARKS WALKER

THE OLD LADY who lived in the shoe and had so many children she didn't know what to do had no more trouble looking after her flock than Madam Lycosa. I found her one day as I was sitting on the ground weeding the rock garden. The sun, dropping low in the west, threw a fig-tree's shadow over me. There was just enough twilight left to enable me to distinguish weeds from flowers. When I yanked out the last clump of crabgrass, I noticed something stir in the loose, dry leaf mold.

I looked again and saw a large wolf spider, *Lycosa scutulata*, whose body, exclusive of her eight long legs, was more than an inch long. If Madam Lycosa, with her eight eyes, could see better than I with two, she offered no such evidence. When I looked more closely I shouted aloud in amazement. Her back was a mass of long-legged children. The old egg sac, that Lycosa had sunned so carefully when it held her eggs, lay wrinkled by her side.

Every few moments a young spider, whose anatomy was mostly legs, would climb from his mother's back, take a short run on the ground to stretch his legs, and then scramble up one of Lycosa's legs to her back again. As it was getting dark rapidly, I picked up a piece of roofing paper, placed it over Madam Lycosa and said good night to her and her family, which I estimated to be about one hundred and fifty.

Next morning I hurried out to see my guests and found them where I had left them the evening before. During the night Lycosa had picked up the discarded egg sac and was chewing on it. When the photographer came to take her

picture, I lifted her gently with a tablespoon and put her down on a white dinner plate. Two of the young spiders jumped off their mother's back and walked about the plate to satisfy their curiosity and find out what the smooth white object could be. After one photograph had been taken, Madam Lycosa suddenly made up her mind to quit the spot. She leaped from the plate, which had been placed on a step three and one-half feet from the ground, to the grass. The impact shook all her children from her back. Panic reigned. There seemed to be twice as many children scurrying about as there were when they were grouped in a mass on Lycosa's back.

Madam Lycosa, meanwhile, was heading for the tall timber. I set my foot directly in her path and turned her back. As soon as one of her children recognized one of her legs among the green grass blades, the youngster would climb on his mother's back as nimbly as a squirrel

ascends a tree. But not one-fourth of the children could be found, and I doubted if the mother would find them again.

Three days later, however, not more than four feet from where I had seen them last, I again met Madam Lycosa and her interesting family. Judging from her appearance, she had succeeded in rounding up her entire brood, as they were riding in their usual positions.

There are eight feet on each spider.

If Madam Lycosa had 150 children, that would make 1200 feet or 600 pairs of shoes to provide had they been humans! This was the economic thought that startled me as Lycosa and her brood hurried into the underbrush.



MADAM LYCOSA AND HER MANY CHILDREN

This mother carries her family about with her until they have learned the ways of the world and set out for themselves

TO A FRINGED GENTIAN

Oh lovely flower!
Too soon does Autumn's tread
Fall heavily upon thy fringed head
And bend it low.
Too soon thy beauty fades
And all is sere and brown

Where, a few short days before
Thy unsurpassèd hue
Turned to heaven
Its ultramarine blue.
Its purplest shades renewed.

LOIS COLLINS

The Smallest Flowering Plant

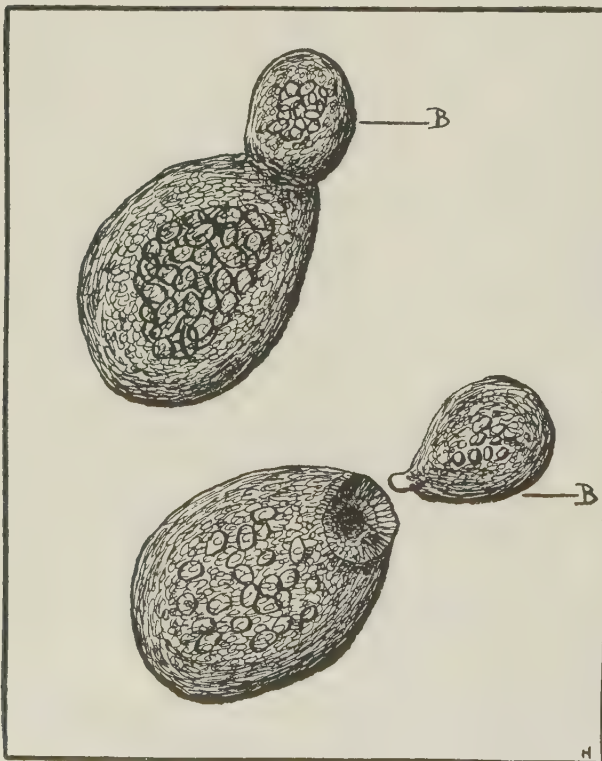
By LEON AUGUSTUS HAUSMAN

MINIATURES always attract attention. We gaze with delight at diminutive ships blown in glass bottles, tiny replicas of locomotives and ocean liners, minute Bibles the size of pocket match boxes. If, with an interest in miniatures aroused, we turn to the world of living things in search of "the smallest" in various groups of animals and plants, we are led into some surprising revelations.

What, for example, is the smallest vertebrate or back-boned animal? The answer is—the tiny Luzon fish, *Mistichthys luzonensis*, as students of fishes call it. It is a creature about a quarter of an inch in length, living in high lakes in the Island of Luzon in the Philippines.

What is the tiniest animal of all? Disregarding the internal parasites of animal bodies, the smallest free-living animal is probably the *Pleuromonas jaculans* (it has no common name), a protozoan or one-celled animal, not uncommon in ditches and stagnant ponds, and ranging in greatest length of body from two to seven or eight microns. A micron is the thousandth part of a millimeter—a millimeter being about the width of a heavy pencil line—or about the 25-thousandth part of an inch; to be exact the 1/25, 400th part. A very tiny creature, to embody in itself all the complex processes of a living being!

And now for the smallest plant. The bacteria, probably, is the answer. And, as we all know, these are so extremely minute that some of them have never been seen—only inferred from their works.



THE SMALLEST KNOWN FLOWER

A greatly enlarged drawing of *Wolffia*, showing the pistil at the left of the stamen

Apparently there is no difficulty in answering the question: What is the smallest of all *flowering* plants? It is not to be found among the chickweeds, nor the tiny little pyxies sometimes erroneously called pyxie "mosses", nor among the little stitchworts or sandworts, but among a lowly and primitive group of plants called the Lemnaceae, embracing very minute ones. The commonest is the *Lemna* or ducks' meat, found floating on the surface of quiet ponds. They are multitudes of tiny green discs, with fine white roots hanging down in the water, often forming dense and far-spreading mats of a bright yellow-green color. It is among this group that we must look for our tiniest of all flowering plants. They float about in the surface film, and just under it, appearing as tiny green globules, just visible to the unassisted eye. *Wolffia*, the plant is called. There are at least three species in our country. The group is named for the physician and botanist Johann Wolff, who wrote during the early eighteen hundreds. Another name for *Wolffia* is pigmy ducks' meat, because it comprises the smallest of the Lemnaceae, or ducks' meat group. One picture shows a full-grown *Wolffia* compared with a common pin, sending out from one side a bud that will later detach itself and become an independent plant.

The entire plant of *Wolffia* consists of but a single

WOLFFIA ALSO REPRODUCES BY BUDDING

Above, the beginning of the process; below, a fully-formed plant separating from the parent

oval or round bright green body, or thallus, devoid of roots. It is not a single cell, but like all higher plants consists of multitudes of cells, which can be readily seen through the moderate powers of a compound microscope. Floating about, it absorbs its nourishment directly from the water, and liberates its wastes thereinto as well. Although measuring about one-half to one

and one-half millimeters in diameter, smaller than the head of an ordinary pin, it is self-sufficient and self-contained.

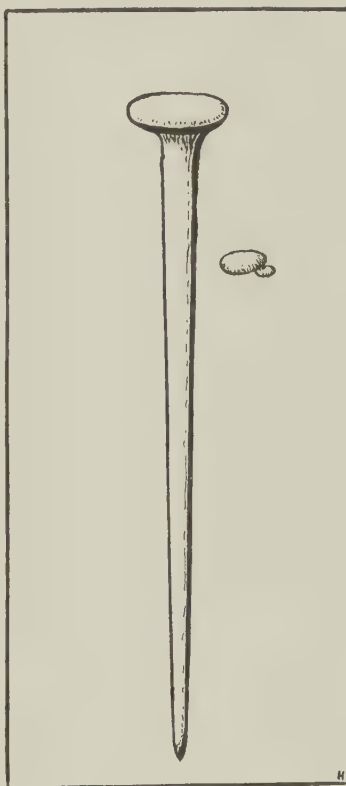
While *Wolffia* possesses no roots, nor leaves, it does occasionally bear flowers. As may be imagined, these are minute in the extreme. They arise from near the center of the plant body, and consist, like the perfect flowers of all flowering plants, of a staminate and a pistillate element. The staminate part of the flower is represented by a single stamen, with its pollen-producing anther at its tip; and the pistillate part by a single jug-shaped pistil, crowned with a sticky stigma for the reception of the pollen. What a minute seed must be produced within the base of the pistil! It is a single smooth, oval body, less than three-quarters of a millimeter in length, that is, less than three-eighths of the diameter of the head of a common pin.

Wolffias most commonly, however, reproduce themselves by budding. This process consists in bulging out one portion of the globular body, through the active multiplication of cells, until the growth, swelling to larger proportions, finally



A TYPICAL WOLFFIA HABITAT

The smallest flowering plant lives in a quiet pond surrounded by cattails and other aquatic plants. Below, the plant compared with an ordinary pin



constricts and breaks away from the parent as a complete plant. In the late summer the plants manufacture starch, which gathers in the center as a series of translucent ovoid granules. Finally the body becomes so freighted with its load of starch that it sinks to the bottom into the mud, where, resisting the freezing of the water above, it passes the winter, to rise again in the spring to the surface

and begin anew its work.

Pigmy ducks' meat may be more common than supposed. Yet because of its swampy hiding places, its secretive habits, and the minute size, it escapes detection, even from those interested in plants.

There are three species of pigmy ducks' meat in the central and northern United States: the common eastern species *Wolffia columbiana* from which our illustrations were drawn; a bright green species with a smooth even surface, ranging from Massachusetts southward to the Gulf of Mexico and westward as far as Minnesota and Louisiana; the papillate pigmy ducks' meat, *Wolffia papulifera*, bearing on its upper surface a single pointed elevation, and occurring in Missouri; and the dotted pigmy ducks' meat, *Wolffia punctata*, a flattened species, deep greenish in color above and yellowish below, marked all over with tiny brown dots, and ranging through the

central states from Ontario to the Gulf. It is sometimes associated with the eastern species, but floats closer to the surface. All the species are important as waterfowl food.

Nature Magazine for November will contain an interesting article on the Cycads, a group that was the most prominent on the face of the earth during the Carboniferous Age but now is seldom seen except in greenhouses. The rotogravure section will have profuse illustrations to accompany the article. Other articles include "The Falcons of Manhattan," by Rosalie Edge and "The Golden Plover," by John Kuerzi. Julian Corrington returns with another of his popular microscopic articles entitled "A Bouquet for Your Microscope."

Shellfish of Ancient Inland Seas

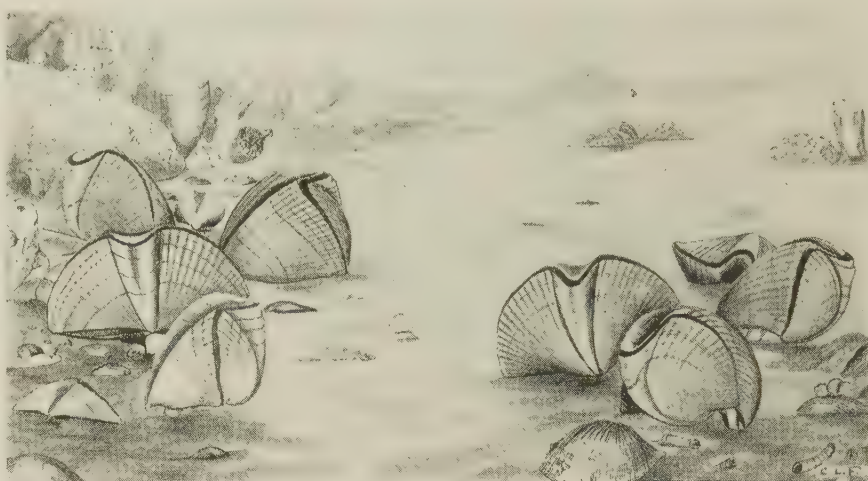
By CARROLL LANE FENTON

ON OAK-RIMMED hills in central New York are ledges that hold strangely frilled shells that lived in an early Devonian sea, more than three hundred million years ago. With them are shields of trilobites and impressions left by seaweed fronds that were buried before they decayed.

We may give these things the forms of life as we pick our way from hill to ravine. Oak woods become a quiet bay whose waters are dimly lit by sunlight that filters down. Here are brown and red algal fronds; yonder a clump of crinoids wave, their bodies perched upon high flexible stalks that make them look like Easter lilies. Near them lie a few sleepy clams, while a spiny snail crawls about in search of something to devour. When it finds a victim it will settle down, bore a neat hole through the shell and eat the flesh within. Many snails get their meals that way even today.

But what is this magnificent shell? Snails are not so loosely coiled—nor do they boast such sets of frills, richly tinted with orange and brown. Nor do they have long tentacles, with which this creature grasps a trilobite and pulls its struggling form toward his mouth. A pair of black eyes gleam wickedly as the trilobite squirms and pulls in his efforts to escape.

This creature is a cephalopod, a distant cousin to the nautilus that still lives in southern seas, and a still more distant relative of the squid. Its brilliantly-tinted shell, and its mantle and tentacles tinged with deep pink, make it quite the most splendid thing found in this early sea. Even the spiny trilobites do not equal its brilliance and graceful form.



LAMP SHELLS OR BRACHIOPODS ON AN ANCIENT SEA FLOOR

These shells lived in what is now western New York three hundred millions of years ago. Several types of coral are in the background. All these forms may be found as fossils near Buffalo

Like many fine things, it is rare. But everywhere we see smaller shells that also are delicate and bright. Some are wide and almost flat; others are plump, as if overfed; many extend into sharp points that look a little like wings. If we skip a few million years, to a sea not far from Buffalo, we shall find thousands of these pointed shells living upon firm gray mud. Many are orange, buff or brown with dark stripes and dots upon ribs and spines. A few bear dark purple streaks, or are mottled with olive and green.

These are lamp-shells or brachiopods. Neither name seems to fit the ones we see, but that does not lower their rank as citizens of early seas. In fact, for a whole era of time, brachiopods held the place that clams occupy today. They lived on sand, on mud, on rocks; they even lived on other brachiopods when space grew too hard to find. Notice that cap-shaped parasite; it belongs to the same group as these shells that spread their delicate, lacy frills out upon the firm, smooth mud. Both are typical brachiopods—and their differences show how varied that group became in habits, structure and form.

Though the commonest of fossil shells, their habits are not well known. So we specially notice how they live, some lying flat on the mud, others attached by flexible stalks, and some by stiff plugs of flesh anchoring them to larger dead shells. Many, in turn, bear other growths—tubes and plumes of little worms, yellow clumps of a fleshy sponge, bryozoans like clumps of moss cemented to the ribs of shells. One would think that space must be scarce—and perhaps it is for creatures like these, that must fasten to something clean and hard above the muddy



FOSSILIZED REMAINS ALSO MAY BE FOUND IN OHIO

This slab of fossil brachiopod shells was discovered near Cincinnati

bed of the sea to insure for themselves a place to live.

Returning to the earth of today, we look for other fossil beds where snails and brachiopods are found. Nor do we have to search long; fossils are scattered through most bedded rocks, if we only take the trouble to look. In southern Iowa, Coal Age seas left banks of crinoids and lamp shells. In Missouri we find the same forms along with snails whose petrified shells are stained deep red by oxide of iron. That wasn't their color in life, of course, and as fossils they doubtless are brighter by far than they were when they crawled about for food.

But must we go far from home to find the shellfish of early seas? Not if we live near Cincinnati, whose hills are crowded with fossils that date from the latest Ordovician epoch. Houses and factories stand on sea beds where lamp shells as plump as hickory nuts once lay on the mud and fed. Others, in lower strata, were thin, with so little space within their shells that we wonder how they had flesh enough to build and work their heavy valves. Snails looked much like periwinkles now living

on the Atlantic Coast; some shared the habit of boring for food that we found among Devonian snails. Habits seem to be pretty much fixed, though creatures that follow them often change.

"Do you want a petrified butterfly?" someone asks as we walk beside a railway track. "Surely," we answer—and promptly find that "butterfly" is a lamp-shell valve showing details of its inner form. First we notice the rounded teeth, by which the shell halves were held in place, separated by an open space through which a fleshy stalk once emerged. In front of it lie two fan-like plates, to which were attached the muscles that opened and closed the shell. Away from these plates, shallow channels run; channels in which blood vessels lay when the brachiopod was alive. Flesh, of course, has disappeared; yet we trace it in pits and ridges of shell built about its membranous folds. Only colors remain unknown, leaving imperfect a treasure through long ages in which invading seas built and later left the beds of rock that now appear in hills, stream beds and quarries.



A CLARK'S NUTCRACKER

The author found this high mountain bird to be as tame as a city pigeon. A picture of him at this close range is a photographic treat.

Clark's Nutcracker

By HARRY L. and RUTH CROCKETT

DRIVING up on an isolated water hole in Arizona always brings a thrill of expectancy. You never know what you may find, sometimes nothing, but at the edge of one we found a Clark's nutcracker feeding. After carefully identifying it with the glasses we drove to the shelter of a group of Palo Verde trees and took out the camera for an attempt we often make with no result. When we carefully approached within fifty feet of the bird, he continued to peer into the cups made by the cattle's feet in the soft mud. Click! We at least had that. A few more steps. Would he take wing? No—he had found a yellow jacket and was carefully and deliberately taking it apart. As he stepped over to peer into the next pocket he found a little moth. We gained a few more

steps and had a snap at thirty feet. Well that probably would be all. No! he stopped. He found a beetle. Let's try to make this a shot at fifteen feet! What, that pack finished?

By that time we had approached close enough to see all the details of feather pattern and diet with the binoculars. After the new film pack was brought and we had taken five more shots, some as close as eight feet, and he had walked over Mrs. Crockett's boots, we decided to leave him to his wasps, moths, beetles, and other bugs.

When we returned a couple of hours later, only two bald faced calves looked up inquiringly from the water hole, but we were grateful for the camera's evidence that a stranger had passed that way.

Last Year's Hornets' Nests

By S. F. AARON

IF THE idly-directed shot of some gunner fails to riddle it and woodpeckers let it alone there is proof to be found in the winter trees that a tower of strength may be made of paper. The wasps and hornets know paper-making. When the first man-made wood pulp paper became an article of commerce it was probably some millions of years after *Vespa* had developed the art. Man has learned to apply heavy roller pressures, refining processes, bleaching and sizings to accomplish that which the wasp does not need, but even then the human product is inferior to a degree. Only by special coatings can we make waterproof paper; but observe the hornet's nest, long exposed to drenching rains and melting snows, and guess the answer to the riddle.

Many six- and eight-legged creatures possess within themselves a material man cannot duplicate either chemically or physically. This is the saliva of which the caterpillars of moths, certain bees and many wasps make their silken cocoons. It is a secreted, gummy substance that hardens to a non-brittle, pliable condition as soon as it is exposed to the air. The spiders secrete it by similar glands differently located and voided through abdominal spinnerets to compose their wonderful webs.

The saliva exuded from the jaws of many adult insects is used as a cement to hold together the material gathered for their nests. Thus the white-faced hornet, the yellow-jacket, the mud-dauber, the potter-wasp and others mix the clay or wood pulp with the sticky saliva, forming a material of superior durability against moisture.

Not the least remarkable about these last year's hornets' nests is the fact that you may cut them down and take them into the house with the utmost impunity. The rightful owners are not there to combat your desecration of their colonial homes, nor are they apt to appear later. They seem to recognize the danger to their nests during the winter period. The adults, therefore, with the ap-



AN OLD NEST OF THE WHITE-FACED HORNET

Hornets' nests may be examined safely in winter as the few surviving adults winter elsewhere. This nest, when cut open, reveals the dead larvae and pupae in their cells

proach of colder weather, go elsewhere to hibernate; often beneath the slightly loosened bark of dead trees, or in rocky crevices too small for the bills of birds or the noses of mice and shrews. Yet within the nests there still remain the bodies of undeveloped hornets whose lives have been snuffed out by disease. Deer mice and birds find them a source of winter food.

Strange that so admirable a construction, the result of the combined labor of an organization that for internal peacefulness, external valor, patriotism and unity of effort surpasses anything man has ever attained, should be thus summarily discarded and forgotten. Each season sees new nests begun and completed by the survivors of hibernation and their rapidly developing offspring that before the middle of the summer may each number thousands of busy workers. For want of clear and sympathetic understanding we are often too hasty and even eager to make war upon the useful hornet, a destroyer of countless flies when it is allowed the freedom of our premises, and a tenant that seldom abuses our hospitality except in actual defense of its home and family.



DEVELOPMENTAL STAGES OF LARVA AND PUPA

In this instance the larva and pupa were found dead from a fungus growth



Mallards in Flight

This group of mallards, pictured as they speed away over the tree-tops after being started from a slough in one of our southern States, show well the general characteristics of a species that is widespread over the earth. So great a favorite is it, that many nations consider it worthy to bear their names. Thus the Britons call it the English Duck; their neighbors across the channel, the French Duck, and our North American aborigines, the Indian Duck. Doubtless the Chinese in ancient times

honored it with their name, for it was probably they who first domesticated this bird so long ago that the exact period is unknown. Today, it is the most widely spread of domesticated species.

By reason of the great extent of its breeding range, the mallard is among the foremost of our species in its ability to withstand persecution. However, its numbers have been greatly reduced in the last few years. Photograph by Hugh Sterling Davis, of Oklahoma.



Woodland Berries

Photographs by L. W. Brownell

The Virginia Creeper, *Parthenocissus quinquefolia* (commonly called woodbine), is rather generally distributed over the eastern half of the United States. The vine climbs readily and soon covers old fences with its trailing beauty. In Autumn its scarlet foliage adds to the seasonal coloring, and its clusters of bright blue berries, persisting into the winter, helps many a mockingbird or robin through the season of stress.

The smooth winterberry, *Ilex laevigata*, although a member of the holly family, sheds its leaves, which do not have the prickly characteristics of the Christmas holly, long before that season. The bright scarlet berries, however, remain to brighten the swamps until late winter.

The climbing bittersweet, *Celastrus scandens*, at the left, is a twining shrub with small greenish white flowers. The berries are a beautiful orange-scarlet color, and if a branch be placed in a warm room before the covering capsules open, they will split, exposing to view the scarlet arils that retain their beauty throughout the winter.



A familiar shrub of old-fashioned gardens that is still commonly cultivated is the snowberry, *Symphoricarpos racemosus*. The flowers continue to bloom even after the large snow-white waxy berries, a conspicuous feature of the bush in early September, have disappeared.

Everyone should be able to recognize the three-leaved poison ivy so that it may be avoided at picnics and on hikes. The plant may be found as a shrub, growing erectly, or as a vine climbing on fences, walls or tree trunks. The berry is small and whitish and contains a single stone. There are several varieties of poison ivy, the one represented in the upper right corner being *Rhus toxicodendron*, the common climbing form of the United States.

At the right is a branch of bittersweet on which most of the enveloping capsules have opened. Compare the photograph on the previous page, taken at an earlier stage of development.





The American mountain ash, *Sorbus americanus*, pictured at the left, opposite page, is a beautiful ornamental small tree that grows to a height of thirty feet in favorable locations. At the higher latitudes, and northerly, it is reduced to a shrub. The berries, produced in broad clusters, are bright coral red or deep scarlet, about the size of a small pea and acid in taste. They ripen in late August or early September and are eaten by many birds.

Next to the mountain ash is the flowering dogwood, *Cornus florida*, a beautifully picturesque shrub or small tree of our eastern states. The tips of the branches terminate in clusters of tiny greenish flowers, surrounded by four large bracts which are creamy white or rarely pink-tinged. The ovoid fruit is eaten by many birds. The wood is hard or close grained, and is suited to a variety of uses. It has no great value, however.

The bunchberry, *Cornus canadensis*, also a member of the dogwood family, is pictured at the bottom of the opposite page. The flowers are greenish and tiny, closely grouped and surrounded, like those of its larger relatives, by four white bracts in the center of four leaves. These are followed by the closely bunched brilliant scarlet berries, palatable, but too seedy to be popular. The bunchberry grows in cool, damp mossy woods from our northern states northward as far as the forests extend and from sea level to a considerable height on our mountains.

The first picture on this page is that of the partridgeberry, *Mitchella repens*, a small, creeping evergreen herb with dark leaves slightly heart-shaped at the base. The four-lobed twin flowers are fragrant, usually white on the inside and faintly crimson pink on the outside. The fruit is two united berries, and, when red-ripe, is edible, though nearly all seed. The plant flowers in the spring from April to June and may flower a second time



in the autumn. It grows from Nova Scotia to western Ontario and Minnesota, south to Florida, Arkansas and Texas.

The fruiting plant of the American cranberry, *Oxycoccus macrocarpus*, which grows in swamps or boggy meadows from Newfoundland to Ontario and south to Virginia and Arkansas, is pictured above. It is extensively cultivated in New England and New Jersey for its juicy red fruit. Cranberry jelly has become so closely associated with turkey that no Thanksgiving or Christmas dinner is complete without it.



A close relative of *Rhus toxicodendron* is poison sumach, *Rhus vernix*, a poisonous shrub or small tree from five to 20 feet high. The dull white or greenish flowers come in June, and are borne in loose, slender clusters at the junction of leaf stem and branch. The fruit is a shiny, greenish, ivory or dull white berry that generally persists through the winter. The plant is poisonous at all times of the year, especially so at the time of bloom, the poison being an intensely active acid oil that is effective only in direct contact with the skin. Poison sumach is found from our northern states to Florida and Louisiana.

Above is the American holly, *Ilex opaca*, so popular as a Christmas decoration. This well-known tree may be found in sheltered spots in sandy or moist soil from southeastern Massachusetts to Florida and from Indiana to the Gulf. The fruit is scarlet (rarely a bright yellow) and persists through the winter.

The pokeweed, *Phytolacca americana*, is common from Maine to Minnesota and southward. The fruit is a dark purple 10-seeded berry with a crimson juice. Although poisonous in the natural state both the roots and the berries are used in the preparation of certain medicines, and the latter are of great value to many birds as winter food. When thoroughly cooked the young shoots make excellent "greens," in fact they are considered by some as superior to asparagus.

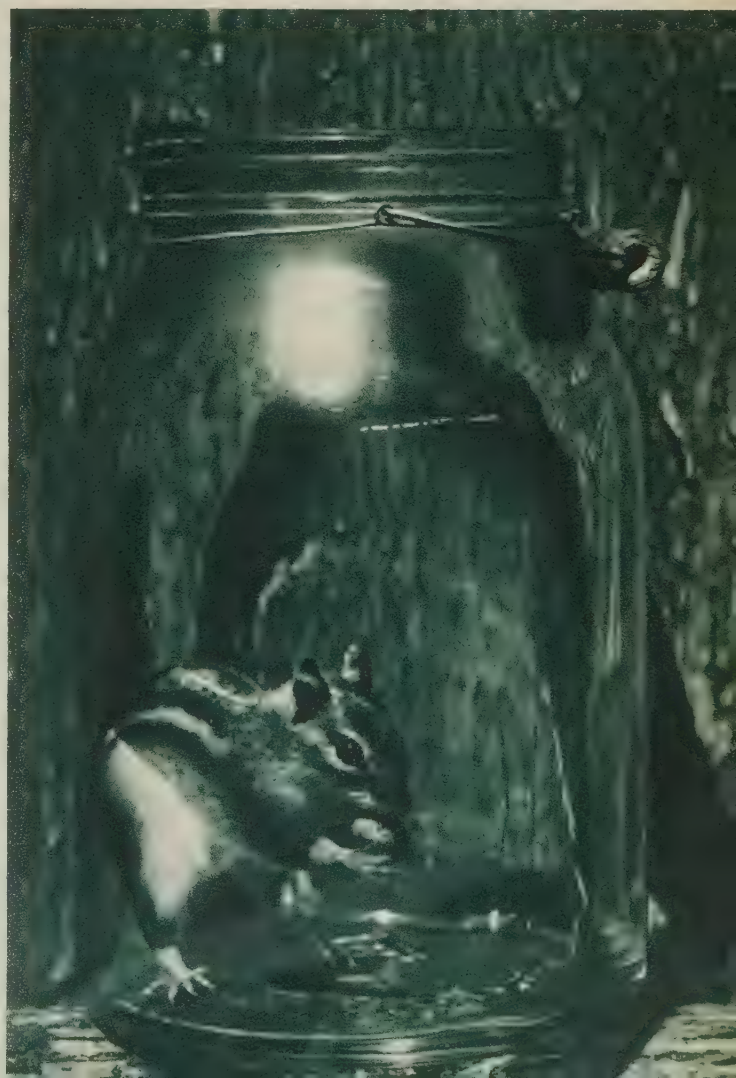


Satan, the Friendly Chipmunk

BY WILLIAM ROTMANS

Satan, the eastern chipmunk shown in the photographs, lost all fear of us when he learned that our Bass Lake, Ontario, camp was the source of peanuts—to him choice morsels. His acquaintance developed gradually, but soon he was a daily visitor. Other chipmunks came to beg peanuts to no avail, as Satan was quite a bluffer and drove all intruders away. He was a greedy fellow, and responded readily to our calls. One peanut never was sufficient, as he could carry three at a time in his mouth, tucking one into the pouch on either side and carrying the third with his teeth. All the nuts were carefully cached in the same secret hiding place where he kept his winter supply. Before long he came so regularly that he seemed like one of the family. Even screen doors would not keep him out. He would climb the screen and scratch noisily to attract attention.

We tried a number of experiments with Satan to test





but a tub of water held no terrors for him if a nut floated in the center. His method was to grasp the edge of the tub with his hind feet and splash and splutter until he had washed the peanut to the edge where he could grasp it. His long, wavy tail was used to good advantage in aiding him to keep his balance during these maneuvers. On a tightrope he was as agile as a monkey and here also used his tail to advantage as he crawled upside-down to-

ward a nut that was wired in the middle. He would shell and eat the peanut in this position.

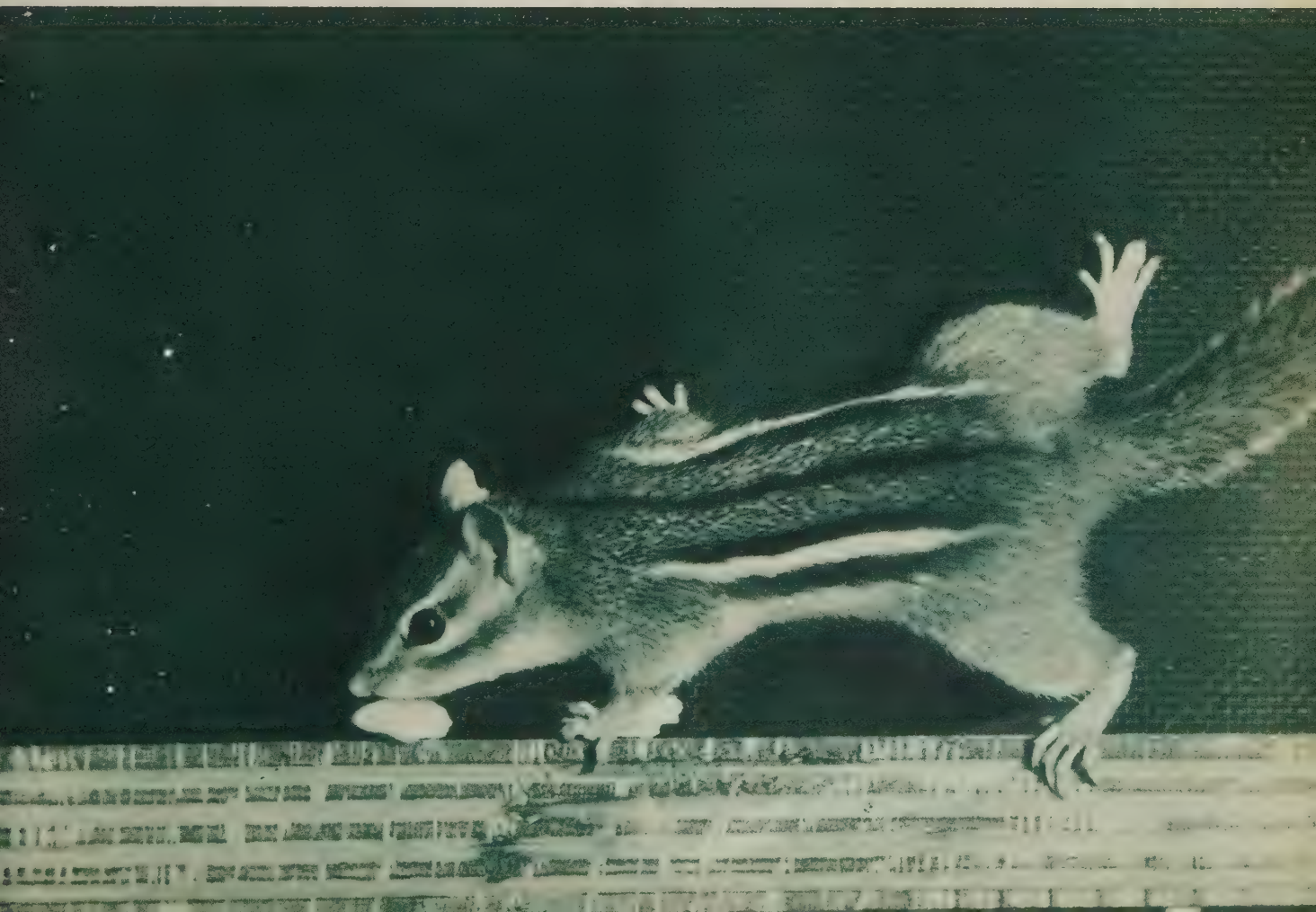
his intelligence and ingenuity. Perhaps they were merely tests of his greed, however, as the pictures show he would go anywhere for a peanut. We placed one in the bottom of a gallon jar and set it against a tree trunk. Satan could not figure out why he could see the peanut and yet not touch it. Glass was a puzzling substance to him. Soon, however, he scampered up the tree and entered from the top, and so seized the prize.

Satan apparently did not care for aquatic sports,

ward a nut that was wired in the middle. He would shell and eat the peanut in this position.

On the opposite page, Satan can be seen tucking a third nut away while his jaws already bulge with two. He balanced himself with ease on the edge of the bowl, using only his two hind feet, meanwhile picking up the nuts from the bottom of the dish. The last picture shows how he would work himself along the most precarious ledges to add one more peanut to his collection.







Gulls of the Coronado Islands

BY LEE PASSMORE

Photographs by the Author

Out in the Pacific Ocean, twenty-five miles from San Diego, California, and seventeen miles south of Point Loma, are situated the Coronados, a group of three islands belonging to Mexico. The nearest one to the coast lies seven miles from Lower California. They are really mountain peaks that rise from the bottom of the ocean. All three are rough and barren.

North Island is one of Nature's biological wonderlands. Thousands of nests filled with eggs and birdlings lie unprotected during the nesting season, as there are no prowling beasts to do them harm. The reason for this is because there is no fresh water on the Coronados, without which land animals cannot live. Nevertheless, the

nesting birds seldom leave their nests as ever-watching gulls are ready to swoop down and devour eggs or even young cormorants or pelicans.

The first picture is that of a Western gull, *Larus occidentalis*, and was obtained only after more than two hours of careful approach to the nest. The wary bird left the nest several times during the author's approach but returned to sit upon the eggs as she became more accustomed to his presence. Step by step the camera was moved nearer. At times she would stand up, preparatory to taking flight, but would settle down again when the photographer remained perfectly still. This was repeated many times, and at each operation a few

feet were gained. At last, feeling that the bird would not permit him to get any closer, the photographer snapped the picture. The author considers this one of the best pictures ever taken of a nesting gull.

At the sound of the shutter, the gull left her nest and stood on a rock near by. This was only for a moment, however, as the bird by this time was thoroughly frightened. Just before she took flight another exposure was made, and this shows her eggs in the nest partly hidden by the shadow of her body. The nest measured 12 inches wide and was quite shallow. It was composed of small dried sticks and weed stems. The bird and the eggs were sheltered from the wind by a large rock beside the nest. The male stood by on this rock and no doubt warned the mother bird of any approaching danger. The eggs, shown here about one-third actual size, were olive-green, marked with brown splotches. The nesting season of the Western gull begins early in April, and continues well into July; three is the usual number of eggs found in each nest.

Members of the United States Biological Survey, the Scripps Institute of Oceanography and the Natural History Museum of San Diego visit the islands each year, making surveys of all wild life and





gathering much information of value to science.

The photograph of the Western gull chicks was taken when the birds were only a few days old. They were about the size of domestic chickens and were attractively covered with a mottled down. The nest was lined with wing and tail feathers of gulls, probably from molting birds, and the mother had thrown from the nest one egg that had failed to hatch. The ice plant, *Mesembryanthemum*, grows thickly throughout the islands and provides an excellent camouflage for the young gulls. The smallest of the three birds shown in this photograph was about three or four days old, while the larger two were nearly one month old. Their main diet is fish, brought by the parent birds, who feed their young, as do most aquatic birds, by regurgitation.





Tornadoes— Not “Cyclones”

By C. F. TALMAN

Meteorologists have been trying to persuade the press and the public not to call tornadoes "cyclones" for more than half a century. A cyclone is a vast system of winds directed around a center of low atmospheric pressure. The name implies nothing about the strength of the winds, which may be anything from a breeze to a violent blow. A tornado is a small, local whirlwind, always of terrific violence. The accompanying pictures all relate to true tornadoes. That they are of tremendous force is indicated by some of the feats they perform, as here pictured. It is estimated that the speed of the whirling winds may reach 500 miles per hour. If you try to form a conception of the force of such a wind, remember that a wind of 60 miles per hour can uproot good sized trees and that the force increases approximately as the *square* of its velocity.

At left are four stages of a Nebraska tornado. While her neighbors scurried into their tornado cellars, Mrs. Roy Homer had the courage to snap this series of pictures showing the black clouds rolling together, the funnel starting its descent to the earth, reaching a small pond that it sucked dry, and finally striking a farmhouse. Pictured below is the testimony of the force of a tornado. This blowing of straws into trees and posts is one of the oft-reported freaks of a tornado. Pictures unless otherwise credited from the U. S. Weather Bureau.





The tornado that swept across the adjoining corners of Missouri, Illinois, and Indiana on March 18, 1925, was the most destructive in American history. The terrific blow took 742 lives, and property damage approximated \$13,000,000. The first picture on this page shows what was left of Griffin, Indiana, when the storm had passed. Three survivors are pictured searching the wreckage of their home in an attempt to salvage something from the ruins.

Proof of the tremendous force of the Tri-State tornado is shown in the other photograph, taken by the American Red Cross; a two-by-four plank was blown through the trunk of a large tree.

On the opposite page is an excellent close range photograph of a Kansas twister taken by Ira B. Blackstock, of Hardtner. He allowed the whirling monster to approach as close as he dared before he snapped his camera shutter and darted into a tornado cellar. Two stages of a tornado that occurred at Peshawar, India, in 1933, is pictured at the upper right. Photograph by R. Pleasants of the Royal Air Force. The long, rope-like specimen that appears to be reaching to the sun occurred at l'Isle, in the Canton of Vaud, Switzerland, in 1932, and was photographed by R. A. Schmidheini. The last photograph is of an unusually thick tornado, that swept over Oklahoma in 1927.





An 85-Mile Panorama

Many scenic wonders of our National parks can be recorded on the camera film. This one, taken by Les Taylor, of Jardine, Montana, is particularly interesting because the Grand Teton Mountains can be seen in the background, 85 miles airline distance from the point where the picture was made. Mr. Taylor set up his camera at the Crevice Ranger Station, Absoraka Na-

tional Forest, Montana, the northern boundary of Yellowstone National Park. At the extreme left is Mount Washburn, 10,317 feet above sea level, and at the right, Bunsen Peak, 8,500 feet, can be identified by its cap of snow. Mr. Taylor used a 33 recomar Kodak with a Wratten filter and infra-red plate to record this beautiful scene. Today's cameras have remarkable range.

★ Conservation ★

A section of Nature Magazine devoted each month to the expression of practical opinions on the vital issues affecting our use and abuse of natural resources, including wildlife, and dedicated to the purpose of assisting Americans to play a militant part in the attainment of constructive conservation aims.

ARTHUR NEWTON PACK, *Editor*

PLEAS FAIL TO SAVE WATERFOWL FROM DESTRUCTION

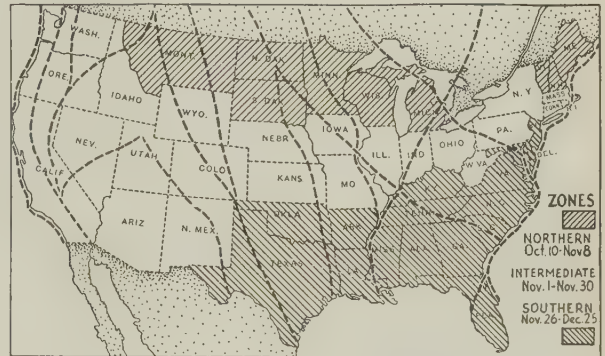
Our ducks and geese have been pushed one step nearer what appears to be their inevitable fate—stuffed specimens in museums. An open season has been declared when the desperate condition of the birds, complicated by serious drought destruction, demanded a closed season.

Under the provisions of the regulations, recommended by the United States Bureau of Biological Survey, adopted by Secretary of Agriculture Wallace and approved in a proclamation by President Roosevelt, a so-called thirty-day open season is declared. The season for the northern zone is from October 10 to November 8; the intermediate zone from November 1 to November 30; the southern zone from November 26 to December 25. Thus the ducks, on the migratory flight southward, are subject to shooting from October 10 to December 25—seventy-six days. And for those birds that come from north of our border, an overwhelming majority, the period of danger is further increased. Furthermore, duck hunters with means and leisure can migrate southward also.

Conservationists may gather whatever solace they may from the fact that baiting, sink-boxes, batteries and live decoys are prohibited by the regulations. Some hunters are hoping that mechanical ducks that flap their wings and scud over the surface of the water will get around the prohibition of live decoys. These will be placed on the market. Other subterfuges will be tried, and Illinois "sportsmen" have announced that they will fight the regulation against baiting as an infringement on their rights.

Also under the regulations redhead and canvasback ducks and Atlantic brant are added to the list of migratory waterfowl that cannot be shot legally. As one duck hunter remarked, "You have to be an ornithologist to know what can be shot." And he substantiated our own conviction that many redheads, canvasbacks and Atlantic brant will be shot and left to rot by hunters who shoot first and then fear to be found with a protected bird illegally in their possession.

In announcing the regulations the Biological Survey asserts that stringent restrictions are being continued to



WATERFOWL SHOOTING SEASON, 1936

Here are shown the shooting zones into which the United States has been divided. Alaska has also three zones, the northernmost beginning September 1. Canada will have two months of shooting.

The broken lines indicate the principal flyways followed by the waterfowl in autumn. Since the autumnal flights start from the northern breeding grounds, it follows that the ducks and geese are exposed to the gunfire of successive groups of shooters while traversing the various zones. Thus, for example, a mallard or pintail raised in the Yukon, and wintering on the Atlantic or Gulf Coast, encounters a shooting season of 116 days as he passes along his route through Canada and the United States. Other migrant ducks and geese may suffer shorter seasons, but scarcely any less than two months. A study of this map should reveal to any fair-minded student of the subject the willful fallacy that lies behind the so-called 30-day season.

cut down the annual kill, and that such regulations reduced the kill last year. Indications are that these restrictions were helpful, but not in proportion to the needs of restoration. And, further, the disastrous drought in the breeding grounds of the birds in the western United States and the prairie provinces of Canada has resulted in continued serious decimation this year. These conditions the Biological Survey admits, but justifies the open season by contending that nesting conditions "on the most important breeding grounds are at least as good as they were last year and that in many sections there is a

definite increase in some species."

If we assume the improbable, that losses from drought have been entirely offset by conditions farther north, we still do not see the reasoning that justifies an open season aggregating seventy-six days of shooting and a bag limit of ducks of ten a day. We believe that the restrictions, although over-vaunted, are vitally important. We

believe, also, that a sincere desire to restore our migratory waterfowl on the part of those responsible would have suggested the propriety of paying more attention to the numerous conservation societies and informed individuals who based their appeals for a closed season on a full knowledge of the desperate needs of the birds, rather than on political considerations.

One Reason Why Hunting is Condemned

HUNTERS appear chagrined because opposition to their conduct of so-called sport steadily increases. They should not be surprised, however, as increase in protective sentiment naturally keeps pace with advance in civilization. All of the higher attributes of man, including love of beauty, humaneness, and the sense of universal brotherhood, cry out against unnecessary killing of anything.

The excuse is often made for hunting that it is the expression of a deep-seated instinct. Even if this were true, which is debatable, it is not equivalent to saying that hunting must go on. Our whole process of civilization involves the curbing of propensities of men that are not for the common good. Hunting certainly is in that category, as it is participated in by a minority and is steadily pressing toward extermination numerous interesting creatures of the wild that are the property of all of the people. The minority has no right thus to kill animals to the extent that the public is largely or entirely deprived of the value they have alive as objects of beauty, interest and utility.

The facts that hunting was of necessity carried on by primitive man or that it was freely pursued by our great grandfathers, without apparent harm, do not serve to justify it today. Increase of population with all of its correlatives inevitably brings about restriction of privileges. With existing density of population, hunting is obviously destroying itself and with further increase ultimately must end. Why cannot mankind realize the situation and as a simple act of intelligence voluntarily stop hunting at least so far as it is a threat to the existence of living creatures before any more are added to the pathetic roll of the exterminated?

Hunting is a threat not only to the species directly pursued, but because of the associated practice of "vermin" control, it is a menace to many more, indeed to an indefinitely large number of actually or fanciedly competing species. This is a comparatively modern development that also is contrary to the trend of civilization. It seems in fact that hunting progresses in severity and ruthlessness at the same time that civilization in many other respects is ameliorating the behavior of man. "Vermin" control is an "efficiency" phenomenon; it seeks to yield maximum bag for the hunter by reducing losses caused by predators and other competitors of the hunted species. But "efficiency" is the last thing to be encouraged when the very existence of hunted species is at stake.

The Indians never thought of killing wolves because they too ate buffaloes, and our forefathers never treated the bobcat as "vermin" because it might consume an occasional fawn. They were not trying to "hog" everything; that is the particular glory of the present generation of hunters. For every species these zealots are hunting to its doom there are numbers of others they persecute with "vermin" campaigns in a multiplicity of forms, each made as ingeniously destructive as possible.

In the case of the bobwhite, wandering cats and roaming dogs, two species of skunks, the opossum, the raccoon, the cotton rat, Cooper's hawk, sharp-shinned hawk, and several kinds of snakes are regarded as in need of control, and various other organisms are mentioned as minor enemies. For Gambel's quail the coyote, Arizona gray fox, bobcat, skunks, house cat, cotton rat, round-tailed ground squirrel, Cooper's hawk, sharp-shinned hawk, ravens, roadrunner and snakes are listed as enemies. Proceeding to the ruffed grouse we find red and gray foxes, the raccoon, weasels, great horned owl, goshawk, Cooper's hawk, and sharp-shinned hawk proscribed with other enemies appraised as of lesser importance. Thus as the number of game species increases one by one that of "vermin" grows by "leaps and bounds". The temporary "preservation" of game to be shot involves in each case methodical repression and possibly local extermination of an indefinite number of other creatures, a number depending in final analysis solely on the whim of individual vermin destroyers. They go to such absurd lengths as killing the red squirrel, the chipmunk, the box tortoise, the bullfrog and even smaller frogs and toads, the latter creatures at least being much more beneficial than injurious. Among other unjustifiably persecuted species are the armadillo and the roadrunner of the Southwest, and among birds such smaller forms as jays and shrikes do not escape the slaughter.

Considering the weight of sportsman interest in our entire fauna relative to that of the public, killing even of proved enemies of game species can scarcely be condoned. When the warfare is broadened to include manifestly harmless species, and carried on in all quarters as if the primary value of the whole countryside were for hunting, it is time to call a halt.

This great and growing threat to our fauna is due solely to selfishly conceived, but most ill-advised practices of the present day sporting fraternity, who should not be surprised that "vermin" control activities inspire general condemnation and tend to discredit all hunting.

The Plight of the Sea Birds of the San Juan Islands

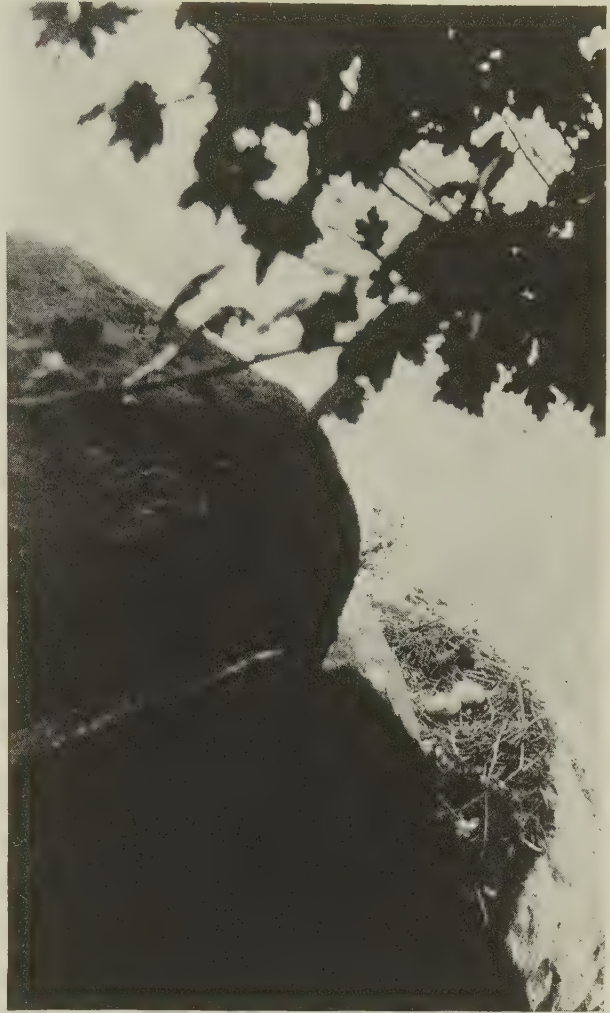
By ELLSWORTH D. LUMLEY

COLONIES of nesting birds possess an attraction for those not particularly interested in birds as well as for scientists and bird lovers. Colonies of herons, pelicans, gulls, terns, cormorants and other colonial birds, when easily accessible and not rigidly protected, suffer from careless observers and curiosity seekers. Little or no thought is given to the sufferings of young and old resulting from prolonged visits, or from the aimless wandering about among nests of eggs and young.

During the past three summers I have spent some time studying the birds of the San Juan Islands and have frequently visited the nesting colonies of sea birds on several of the small islands in the San Juan group. The San Juan Islands, part of the state of Washington, are composed of 428 individual islands and rocks rising above high tide. Of these about 175 are large enough to have been given individual names. Most of the small islands lack fresh water and are so beset with precipitous shores that they are uninhabited by man.

For years sea birds have found many of the smaller rocky islands ideal for nesting grounds. Pigeon guillemots hide their nests in cracks in the cliffs and under slabs of broken rocks. Tufted puffins dig their burrows in the soft earth near the tops of the cliffs. Baird and Brandt cormorants build their squatty nests on ledges of the cliffs and in caves. Glaucous-winged gulls hollow out their shallow nests in the moss and soft earth on the gradual slopes on the sides of the islands.

Young gulls, in attempting to escape enemies, seem to be the most stupid of all young creatures. When approached by people, they waddle or run in search of a hiding place. They will jam their bodies into any opening available, some hiding places being so small that only the head is hidden, leaving the body entirely exposed. Other youngsters will run down into crevices in the rocks where they can never get out, while others will jump over the cliffs into the surf many feet below. The adult gulls sail on open wings overhead, screaming their protests to the intruders, but being utterly unable to offer any effective resistance.



SIGHTSEERS MAY BE AS DANGEROUS AS GUNNERS

Cormorants flee their nests at the approach of humans, exposing their eggs and young to enemies. Picture taken on Flattop Island. Below, the burrows of tufted puffins on Bare Rock Island

Cormorants suffer fully as much as the gulls when molested by people. At the approach of humans the cormorants become nervous, but refuse to leave the nests until sure that real danger is at hand. Diving from their nests on the cliffs, these great black birds fly some distance from the rookery and do not return until all danger is gone. Gulls and crows, being less afraid, quickly take advantage of the unprotected cormorants' nests and rob them of eggs and young. I have seen all eggs taken from a group of nests after a visit by tourists.

During the past three years I have noted a none-too-gradual decline in bird populations on the breeding islands. One of the main causes for this decline





SKIPJACK ISLAND IS ANOTHER BIRD HAVEN

Shown here is the nest of the glaucous-winged gull just after one egg had hatched

is undoubtedly the many visits by boating parties.

During the height of the breeding season I spent three days on Skipjack, one of the small islands having

large breeding rookeries. My second night on Skipjack is memorable, for I was kept awake during the entire night by the cries of the gulls. The day before, a cruising party of about a dozen people had landed on Bare Rock about a mile from Skipjack. I had watched these people through my glasses as they climbed and ran over this small island thickly populated with birds. Their stay on the rock was long; they appeared to be having a great time searching every rock and ledge for young birds. Baby gulls are soft and fluffy and these invited handling and fondling. Great flocks of gulls, cormorants, puffins, and guillemots were kept in the air during the exploration. The cries and screams of the gulls and the high piping notes of the guillemots could be plainly heard, and for hours after the pleasure seekers had left these birds kept up their anxious cries. Undoubtedly the loss in bird life from this one visit was great.

Such visits as this are not uncommon on all of the rookeries. Evidences of campers and picnickers are to be seen all summer. Rabbits are plentiful on most of the islands, which encourages many visitors to bring small rifles ashore. Even if birds are not deliberately shot, shooting around breeding colonies tends to disturb the nesting birds.

It is little wonder that the birds are forsaking their old breeding grounds when they are continually experiencing such disasters.

With the San Juan Islands beckoning more and more campers and tourists each summer, there is great need of protecting these breeding colonies of sea birds. The rapid decline of the breeding populations on old established breeding grounds has caused some concern among the members of the Northwest Bird and Mammal Society. This organization has taken steps to have all islands harboring rookeries posted against trespassing and patrolled by the Coast Guard. Unless such action is soon taken, many of these rookeries will be forever forsaken by the birds.

QUAIL IN ALABAMA

Reduction in the bag limit on quail in Alabama from fifteen to twelve has been announced in the 1936 regulations. Also the Alabama Conservation Board has authorized a State quail farm. In giving out the regulations for the hunting season this year Commissioner I. T. Quinn reported "a definite increase in the number of persons taking game."

FARMERS WORK ON WILDLIFE REFUGES

In extending assistance to about four thousand farmers in drought areas, an allotment of \$600,000 has been made for work on waterfowl refuges and wildlife land in nine states. Men will be assigned to work by the W.P.A. on the areas now administered in behalf of our wildlife by the Biological Survey. Particular emphasis will be placed on water control and conservation, a problem that is even

more far reaching in importance than the preservation of wildlife alone.

EAGLES GIVEN A SANCTUARY

The American eagle population of eastern Pennsylvania totalled one pair nesting on Mount Johnson Island. This pair now has two youngsters on the wing. Upon this family depends the restoration of our National Bird in that section. That there may be some hope of this is found in the establishment of the island as an eagle sanctuary. This has been made possible through cooperation between the Philadelphia Electric Power Company and the National Association of Audubon Societies. Richard Pough of the Audubon Association, announcing the action, says that it is up to Pennsylvanians to preserve the bird. He wonders whether Pennsylvania newspapers will "continue to make heroes of killers of this noble bird, or denounce them as robbers of one of our priceless heritages?"



PHOTOGRAPH BY J. C. ALLEN

BOB WHITE IS A PRINCE OF A GOOD FELLOW AMONG HIS KIND

In one Florida village it has won the friendship of the community and increases in numbers under conditions that the hunting fraternity in other sections claim would be fatal to the bird

Bob White Makes Friends

By WILBUR F. SMITH

"GOD put the quail here for man to shoot," declared an eminent sportsman in the course of his address to his fellow Nimrods. While I pondered upon his intimate terms with the Deity, I thought also of my long acquaintance with quail in New England, where their numbers fluctuate with the severe winters and open hunting seasons. And I recalled having heard the hunting fraternity attribute quail scarcity to these winters, vermin and all sorts of things except over-shooting.

Then, several years ago, I went to Florida for the winter. There the weather bore no relation to the supply of quail, while hawks, owls and other wild creatures, as well as the hunters, bore the same relation to quail as in the North. I found a little fishing village wandering along the shore of a beautiful bay, its population doubling with winter visitors. There I found quail in greater numbers than I had ever known before in a given area. They were running all over the village, feeding at door steps.

From "old timers" I learned that, before the forests were cut off, this region was a paradise of wildlife. Deer and wild turkeys were plentiful; sandhill cranes numerous; alligators many. Great flocks of wild ducks passed the winter on the bay; ibises, egrets, herons and various shore birds abounded.

Today the picture is changed. Logging and forest fires have reduced the necessary cover. Those who should know say that "there is not a deer or a wild turkey in the county". A heavy fine protects the sandhill crane, and pitiful flocks of ducks come to winter instead of thousands. Only a remnant of the herons and egrets and shore

birds remain, although the egrets seem on the increase.

In the village, however, the quail have maintained their numbers—perhaps increased—and wander about unafraid. The majority of the people enjoy their presence, feeding them and protecting them. Then, too, the village has been made a breeding ground or sanctuary, and, while there is small evidence of official protection and some whisperings of illegal trapping, the quail maintain their numbers and remain one of the village's chief attractions.

Living within the area are two families of bald eagles, and one afternoon I saw two red-tailed hawks, one marsh hawk, one red-shouldered hawk and two sparrow hawks. When the owls begin to nest, the hoot of the barred owl can be heard almost any night, and, now and then, the great horned owl. Thus the much-publicized enemies of the quail are present.

Intrigued by this example of quail plenty, I gathered information from thirty-nine homes in the village, asking whether the householders had quail in their yards, whether they fed them, and how many they had. Thirty-eight had quail and thirty fed them. The number of birds reported in this small village totaled 580, undoubtedly too large a figure because some birds certainly visited back and forth. However, the fact that the numbers of birds reported varied from four to thirty-five shows that there must have been many separate flocks.

It was interesting to note that there was a distance of three miles between one home, where thirty quail were reported, and another that boasted twenty-two. Furthermore, bald eagles nested within five hundred

yards of each of these homes, one of these eagle nests having been in use seventeen years.

This unplanned quail program started in 1914 when a man who was somewhat of a hunter, and who knew quail ways and could "whistle up a flock", built a home in the village. He put out food and the birds accepted his hospitality. A woman neighbor followed his example and the custom spread.

Some may say that feeding the quail makes them lose their caution and turns them into easy prey for their enemies. The years prove otherwise, and the birds are still easily frightened and flush quickly. To those who know Bob White only through their hunting experiences these stories may sound strange. They are, however, well known to many who have observed them.

The birds have made strong friends. One villager, who had hunted much, said that "after I began to feed the quail I never could bring myself to kill one again". One of the best friends of the birds was an ex-commissioner of the county who spent much time on his doorstep with a flock of quail busily feeding at his feet. Other residents have come to love them sincerely.

When a flock of quail comes to the dooryard each morning and evening, mingling at the feeding place with the larks and doves, jays, blackbirds and woodpeckers, one sees at first hand what a prince of a good fellow he is among his kind. Perfect manners, engaging ways, sweet love notes and handsome carriage are qualities that hold old friends and make new ones of those people who each year make the village their winter home.



Signs of the Times

THE SIGNS of the times point to overproduction,
From ocean to ocean of billboard construction.
One look is enough to conclusively prove it;
If you harbor a doubt, come along, let's remove it.

Yes, Sunday or Monday or any old day,
Go East or go West, just whichever you say;
If you see any room for more signs to install,
I will eat my old hat, rim, lining and all.

On starting, before we have shifted to high
You will see an assortment of signs going by;
And from there to its end, the Oregon Trail
Is littered with signs of something for sale.

There's corn plaster, ketchup, tooth paste and powder,
Camels, Old Gold, Lucky Strike and clam chowder;
Notox, molasses, spaghetti and voile,
Horse-radish, mincemeat, and cod liver oil.

Lip stick, Shinola, pills, tractors and cars,
Chewing gum, borax, perfume and cigars.
Beeswax, bananas, Post Toasties and cheese,
Women's pajamas and men's B.V.D.'s.

Rumble seats, roadsters, coupés, limousines,
Hot water bottles and freezing machines;
Tourist-camp cabins and kitchens de luxe,
Fresh eggs and butter and pedigreed bucks.

Radios, rattlebox, root beer and rouge,
Overalls, underwear, gum boots and shoes,
Baby food, biscuits, Peruna and paint,
And maybe you think that is all, but it ain't.

We dash round the curve with a swoop and, by golly,
There looms up a sign: "Hot Dogs and Tamale."
And close by the bridge where the tiny stream trickles
Appears "fifty-seven odd species of pickles."

All shapes, size and colors of signs can be seen
At each likely spot, and others between.
Where one peters out another commences,
On stumps and barn doors, henhouses and fences.

And now we are home; 'twas a nice buggy ride;
You saw the display along the roadside.
Pray what do you think of the signs we condemn;
Do you get any kick out of looking at them?

DAVID R. CHURCHILL in *Spinnings*
from the *Cobwebs*.

Trees for Highway Beautification

Does your town need a shade tree commission?

By LOUIS B. AMBLER, JR.

Former technical adviser, Ardmore, Pa., Shade Tree Commission

IN THE conservation of our natural resources, we must consider not only the preservation of those resources which are fundamentally utilitarian, but also those which may be defined as both utilitarian and esthetic. One of the most important of these resources is the beauty and comfort of our highways provided by shade trees and their accompanying smaller plants. It is found that a most satisfactory method of preserving and of re-creating the beauty which has been pitifully laid waste by man in his great engineering enterprises of public highway construction is by the formation of shade tree commissions that shall function to their fullest extent. A shade tree commission has been defined as a local governmental unit authorized to have custody and control the shade trees, authorized to plant, remove, maintain and protect the shade trees along the public highways.

Several of our states, realizing the importance of highway beautification, and recognizing the economic and pleasurable benefits which may be derived by their conservation, have passed necessary legislation to permit the formation of township, city and county shade tree commissions. This action is commendable. However, although a few commissions are functioning efficiently, many practically have gone out of existence owing to poor management and lack of funds. Popular opinion is the only force that can successfully combat the selection of untrained political appointees as advisers, and the use of public funds for many political enterprises of lesser significance than the care of our roadsides. It must be remembered that trees have never been nourished well on politics; the two are incompatible. The conditions under which roadside trees are forced to grow are anything but ideal, and as a result they require special attention for their preservation. In addition to the preservation of the existing trees, consideration must be given to the future development of the highways in relation to the shade trees and general roadside development.

In order to understand more clearly the value of a body which is formed for the protection and care of existing and future shade trees along our highways, we must realize the value of such trees to a community. They form the largest growing landscape unit and provide the most outstanding natural features in the usual small town or suburban community. The economic value and desirability of a residential district depends materially on the existing trees, or at least on the potential trees. They provide not



PLANT YOUR TREES AS YOU BUILD YOUR ROADS

Few main highways have the beauty of this tree-lined country road, but local shade tree commissions could remedy the situation

only shade, but a certain restfulness which cannot be obtained by the construction of any of man's artificial contributions to our life. In the active existence that we are leading this restfulness is essential to our physical as well as our spiritual well-being. Even the most insensitive person cannot deny the comfort he has gained by obtaining refuge from the blazing hot sun in the shade of a spreading tree.

We are speedily destroying the balance of Nature for which trees are responsible. They cannot exist without our continual succor. We have already interfered with them by artificial construction and by the unintentional importation of foreign diseases and insect pests. As the highway trees cannot continue to flourish without our help, and as they are undeniably community assets, communities without doubt are justified in supporting a government unit whose duties are to preserve the tree life for themselves and future generations.

As more information is known about the functions and duties of a unit created for the care of our forests than one whose duties are to care for our shade trees, it may be well to discuss briefly the similarities and differences in the activities of the two groups. Obviously, both units deal with trees with similar disease infections, similar

insect infestations, similar destruction by vandalism, fire, carelessness, ignorance, and destruction for immediate gains without consideration of the future. The shade trees along the highways suffer from highway construction, causing root cutting, and the lowering of the water-table; they suffer from bad air conditions caused by smoke, soot, and dust, and poor soil conditions caused by escaping illuminating gas and from unnatural drying out of the soil. These factors weaken the trees and make them more susceptible to diseases and insects. In shade tree work attention must be given to individual trees, while in forestry this is impractical. A person in charge of the shade tree commissions activities must understand the use and care of trees for street tree purposes. He must be a horticulturist and a landscape designer. He must know the relative values of trees for various locations and must understand the relationship between the trees on the highways and the actual construction of the roadway and the public services using the highway right-of-way. And finally he must be able to visualize the present and future need of planting along the highways.

The actual supervision and jurisdiction of a shade tree commission is confined to the trees along the public highways. However, in the control and eradication of extremely bad disease and insect conditions it is desirable to establish an advisory relation between the commission and the property owners. The necessity for absolute control of the shade trees along the highways cannot be justifiably denied. With this control it is possible to stimulate proper care and discourage the harmful and ill-advised work which is often performed.

Every shade tree commission must set up a series of regulations, which, if adhered to, will result in the best possible care and protection of the trees, the proper elimination of dangerous conditions, and the best possible technical advice for the planting of new trees. A permit must be required for all work performed, otherwise it would be impossible to study the condition of the trees and advise for further treatment and future planting. The commission should encourage more tree care, but must insist that whatever is done must be performed properly; a regulation which will result in healthier trees and finally in the improvement of the appearance and desirability of a community.

In order to be a unit worthy of support a shade tree commission should show actual work performed—work which improves the condition of the trees, improves the safety of the highways, insofar as the trees affect it, and increases the number of trees planted in its community. Its actual work also includes the protection of trees against

vandalism, fires, carelessness and ignorance. An understanding and co-operation must be established with the public utility companies, which will result in the distribution of their services without the mutilation of our roadside trees and the ruination of the beauty of our highways.

A very important service which a shade tree commission must render in order ultimately to succeed in its purpose is to incite within the residents a certain tree-mindedness which will cause them to be more conscious of the trees and their preservation. This objective may be achieved by education in the schools, distribution, through the garden clubs and other civic organizations, of interesting material relating to shade tree problems; and in the publication of articles of timely interest in the local newspapers. The finest and most permanent educational features are first, the actual example of the local government in realizing the necessity for such a commission, and secondly, the example set by the commission itself in carrying out actual work in the best possible manner and showing that a real improvement may be seen by the proper use of even a limited budget.

Roadside development or beautification and the work of a shade tree commission are closely related. It is essential to realize that roadside development starts with the original design and construction of the highway. To attempt to plant shade trees and develop the borders of a highway which has been designed from the utilitarian engineering aspect only is similar to painting a building which is structurally ugly in form and detail, in order to beautify it. Proper grading of a roadway must not end with the shoulders, but must be consistent with the existing topography. Even along old established roads much can be done to improve their appearance by proper grading followed up by carefully studied planting. All work of roadside development should be put in the hands of a person well informed and experienced in landscape design.

Certainly, a unit dealing with the creation and conservation of beauty along our highways, as does a shade tree commission, is worthy of our unfaltering support. The actual value of an individual commission will rest with the amount and quality of the work performed in caring for the existing trees, and in making the highways not only more beautiful, but safer to travel. The future of roadside development depends upon a perfect co-operation among the services and utilities located in the highways, the units involved in their design and construction, and the people using them. Beauty and utility must go hand in hand in this public service of providing highways for the convenience and pleasure of every community.

VERMONT TO ORGANIZE What may be encouraging news comes from Vermont, where Judge James A. Merrill is laying plans for a state federation "of all organizations interested in the problems of conservation." The real conservationists of the state have their work cut out for them.

All of them, the Nature Clubs, Woman's Clubs, the local chapters of the Izaak Walton League, the Audubon Societies and all the rest must be alert to step forward and see to it that the Vermont Wildlife Federation is one that is sincerely interested in the preservation of wildlife, and that a balance of conservation view is maintained.

The Sportsman

versus

The Game

By ROBERT PAGE LINCOLN

SOME time ago in my newspaper column *Outdoors*, appearing in a leading newspaper of the northwest, I made a statement that did not set well with many sportsmen. I observed, in effect, that the sportsman was interested in killing game, not preserving it. On the face of it this is the truth, the whole truth and nothing but the truth. Obviously the sportsman does not preserve the game when he kills it. He usually makes food of it, true, but as for preserving it in the sense of saving it to live as we understand the word "preservation" there is little need for debate. Of course one might, on the other hand, say that many sportsmen are really "preserving" the game, in that there has been a vogue throughout the northwest to can down pheasants, in fact "pheasant-canning, cold-packing" hunters have been little less than a menace with whom to contend. By this system of preservation it is possible to can down twice the limit of pheasants and hide them away and have pheasant throughout the whole winter, or year. So game "preservation" has its many angles.

We can remember the time when a sportsman made no bones about killing game. He killed it by the wagon-full, and had pictures taken of himself completely surrounded by slaughtered game or leering out from behind a number of suspended deer, with others of his comrades aiming their guns at the dead game, or once in a while one of the members of the group was shown with his knife thrust in the throat of a deer for variety. But those days are past and gone. Hunters no longer want to be considered as killers—they are game-preserving sportsmen. They are supremely sensitive to the fact that with the gradual disappearance of our game, public opinion is becoming more and more aroused, and game killers are, in the estimation of the non-sporting public, in less repute than ever.

So it was that when I innocently stated that the sportsman was interested in killing game, not in preserving it, I received many letters in opposition. In some of these letters it was pointed out that this or that group during the past inclement weather, had actually gone out and had fed some pheasants; and one man got stalled in a snow-drift with a toboggan full of corn that he had intended for the pheasant, but almost froze to death, so the corn was taken back home. Every winter in various snow-bound and ice-clad sections of the country we are treated to news-stories of sportsmen braving the Arctic blasts to feed the poor game birds, and lawyers, doctors and



THERE IS MUCH SOLICITUDE ABOUT THE PHEASANT

Gestures are made at feeding them and then a barrage of guns is turned on them out of all proportion to the good done

merchants are shown patriotically lifting out sacks of grain in the interest of harassed birddom. There is a stipulation apparent here that under no circumstances will the birds be fed so gratuitously unless the papers condescend to have a write-up about it, with pictures taken by the various staff photographers to embellish it. This is necessary, otherwise, forsooth, how would the people know how much the sportsmen are doing for the preservation of the game. I'm asking you!

The fact of the matter is that the average sportsman can do little with regard to feeding the game. If he makes an attempt to do so it is largely a pretense, to build up an impression that has nothing of concrete value to sustain it. The sportsmen in the large cities and in the small towns and villages comprise by far the greater number of the sportsmen. Any game feeding they do is necessarily accomplished around the borders of the cities, towns and villages, all of which, while possibly contributing in a fair degree to the safety of some of the game, is but a scratching of the surface. More than 95 percent of the game lies well beyond the reach of the city, town and village sportsmen. Yet the pretense is fostered that the sportsmen are doing wonders in game feeding. It happens that we have looked into many of these so-called widespread feeding campaigns and have found in no instance anything to justify the statement that any real good was done. The sportsman, regardless of his well-meaning honesty in the matter, is simply unable to cope with the situation.

Every sportsman, whether he admits it or not, is completely stumped by the problems of game increase and game preservation. That he aids materially in game decrease is never regarded seriously; but when he and his brother sportsmen kill a million or more pheasants alone in one state in a year it gives one cause for serious thinking. Were it possible for these sportsmen to return that many pheasants to the land there would be some hope. But all the sportsman can do is sit back and wait for another season to roll around, hoping against hope that in some way or other, quite beyond his ability to outline or fathom, the game situation will have improved to the

extent that he will be in danger of being pecked to death by a super-abundance of game birds. When this super-abundance is not forthcoming his poor brain is unable to find a solution. He gives up. But he is absolutely wide-awake and alert when he issues forth in the field to kill another million or more birds. He is sure of himself then.

Being unable to lend succor in the increase of game birds without paying for it, the sportsman in desperation joins up with some game league or club. This is the last straw. He helplessly becomes what may be termed a bib-and-tucker sportsman, in other words an "eating conservationist". If all the food eaten to save the game were put in one pile it would make Vesuvius look like a mole-hill. As they slosh their oyster cocktails to save the game, men with many chins tell how game should be raised and planted; and, as usual, reports will be read stating, with every confidence, that the game situation is improving; that the waterfowl have undoubtedly increased by the millions; and there will be at least three pheasants in every pot where there was only one before. Then after a few stories whispered around among themselves the banquet to save the game disbands until another date when a noted saver-of-the-game with glossy pants will arrive from the east to tell how it is done.

The whole impression of game leagues, bodies, congregations, and what-not is one of pretense and hypocrisy; pretending they are doing something; but are obstructing rather than materially aiding in anything. This brought about the charge some time ago by leading game officials themselves that such bodies are "abortive" and of little value in themselves to the game movement. Only by a consolidation or amalgamation of these many and various bodies into one great federation, we are told, can anything

be expected. Whether this signifies that there will be more, or less, eating going on in the cause of conservation in the future is not told. Apparently it is impossible for conservation and eating to be divorced in this country. It will never be decided until the decision is made once and for all whether the game is to be saved at three dollars a plate or ten dollars, including a napkin ring. We hope that the Egg-on-the-Chin game club is listening in.

One of the hardest things the sportsman has to face is the slowly dawning truth that sport is getting to be no less than a luxury, and those who wish to indulge in the killing of game must pay the price if they would enjoy their pastime. As it is the sportsman has been in the habit of paying a paltry small state game license fee annually and has felt that that is all anyone could justly ask of him. After paying these few cents he has deemed it his "free-America" privilege to go forth and kill wherever he pleases and to the limit the law allows. But the days of "free" hunting are just about gone, and the hunting cover has been about entirely absorbed, at least in those sections where the game is found in its greatest numbers. There is strong talk about paying the farmer to hunt on the land, something that the sportsman regards as unconstitutional and a rape of justice. But it is coming around to that particular state of things. When the hunter finally comes to a realization of the fact that he will not only have to pay two to three dollars a day to the farmer for the right to hunt on his land, and likewise to aid in paying the farmer for providing protective cover, and raising and feeding the birds, especially in the winter—I say, when the sportsman gets around to that angle of thinking he will be able to contribute something toward the upkeep of the game instead of just contributing to its downfall!

PUBLIC HEALTH SERVICE AND CONSERVATION

"The leather medal for the most outstanding and wilful abuse of fundamental principles of conservation and good common sense should have gone to the Public Health Service in 1934, '35 and '36," declares J. N. (Ding) Darling in an editorial in the August issue of the Izaak Walton League's *Outdoor America*. "Its record of destructive drainage without effort to avoid depletion of valuable wildlife environment fully justified the award, though not without some competition from rival agencies hurrying to spend emergency money.

"But its incongruous program for 1936 caps the climax for destruction without benefit. The U. S. Public Health Service, an aloof subsidiary of the Treasury Department, requests eleven million dollars to drain the State of Maine under the obviously false pretext of 'controlling malaria'. Maine's State Health Department shows the number of cases of malaria at zero. There is not and never has been any malaria in that state. Maine does provide, however, extensive aquatic environment for the

breeding and harboring of waterfowl, woodcock and many species of wildlife which are headed for destruction by eleven million dollars worth of drainage."

Mr. Darling calls this "double-headed burglary", and points to \$41,500,000 requested for similar projects in fourteen states where indigenous malaria is unknown. He points out that funds for "malaria control" have totalled more than a hundred million dollars annually for three years, and that through this tremendous damage has been done to wildlife. Many of these projects have been as unjustified as the plan to eliminate the non-existent malaria in Maine. Mr. Darling never spares the lash and asserts that "the conclusion is inescapable that the U. S. Public Health Service under its existing administration is a pernicious racket."

In these activities we have another glaring instance of one Federal Bureau destroying things that another Bureau is struggling to protect or to restore. Such ridiculous waste is idiotic and inexcusable. Again we say that there must be coordination and cooperation between the various government agencies concerned with our renewable natural resources. This can be achieved through a logical reorganization and consolidation of these agencies.

Watching a Beehive in a Classroom

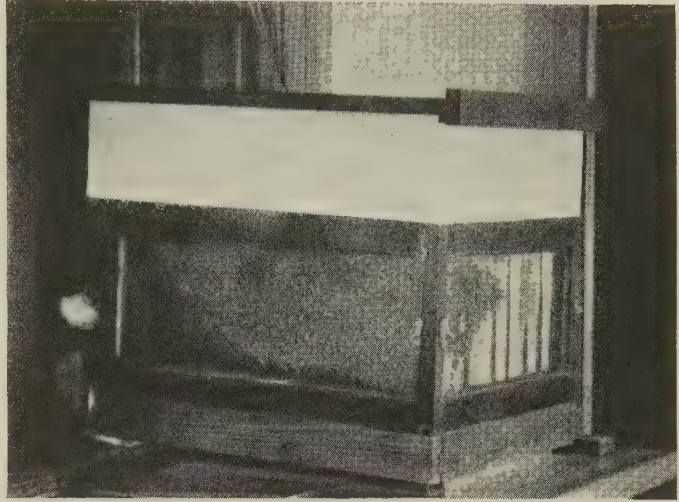
By LILLIAN DAHNKE

WHAT can stimulate a greater interest in Nature than a background of living material—material such as a hive of bees whose complicated communal life is one of the most interesting found in Nature? Living material kept in natural environments emphasizes the interdependencies of one life upon another and brings out the intricacies of food habits, habits of reproduction, individual responses and the importance of them all. Through direct observation the seemingly fantastic habits of each member of the bee community becomes a reality. The continuity of observations of a hive of bees from season to season gives a concentrated picture of the general life cycle found so commonly everywhere in the insect world—egg to larva, larva to pupa, pupa to adult. This type of study develops in the boys and girls a scientific attitude of straight thinking and open mindedness, builds up an appreciation which tends toward a broader understanding of Nature.

This study has been carried on for two years at Haven School, Evanston, Illinois. Haven is a public school with an enrollment of about twelve hundred students. The school has two sections, a lower school with grades from kindergarten through the sixth, and an upper school built on a Junior High school plan for the seventh and eighth grades. Nature Study and Science play a large part in this school's program.

Bees in the Nature room have provided a fascinating project. The observation hive, shown in the picture, was purchased by a class whose interest in bees led them into investigating the possibility of setting up a hive in the classroom. Several visits were made by the boys and girls to neighboring apiaries. Many letters of inquiry were written. Finally, they decided that A. I. Root Company had just what they wanted. This hive is equipped with ten large frames in the brood chamber (or the lower section in which the eggs are laid and the young are reared), and a super, or an upper section, which contains twenty-eight one pound boxes. The sides of the hive are of glass so that observations may be carried on from any location. It is set up inside the classroom with an entrance at a window, affording the bees access from out of doors. Three pounds of bees were ordered from the same company to stock the hive. The fact that bees are sold by the pound and that three pounds, or about 15,000, were necessary for this hive was of great interest.

The bees were shipped in a small wooden box, with a screen over one side for ventilation. The queen was in the same box with her swarm, but she was separated from the rest by a small two inch box sealed at one end with a piece of candy so that she could gradually eat her way out. Many boys volunteered to don the hat and veil and stockinged gloves and to put the bees into the hive. The



BEE STUDY MADE INTERESTING

The hive is Exhibit A in the Nature classroom of Haven School, Evanston, Illinois. The picture, taken in the fall, shows the bees massed along the outer frame, capping over the honey-packed cells

first day was one of great excitement as the bees swarmed against the windows. We wondered if they were going to leave our glass-sided home. As soon as the queen ate her way out of the candied entrance of her little box the swarm became quiet. Then the everyday activities began.

These boys and girls first observed the fitting together of the tiny wax scales which the bees scraped from their abdomens and fitted into hexagonal looking cells with what we supposed were the sharp teeth on their hind legs. They worked so rapidly and with such sleight-of-hand procedure that we could not follow them step by step. We were interested, though, in observing that several seemed to work together in the building of one cell. One boy reported that an author said the long tongue is used to make the sharp corners and that the other bees follow after the first one in order to pinch and stick the scales together, each adding his bit to the making of a single cell. After so much effort, applied from what seemed to be useless turning and shaking about, the combs were completed, row by row, until they reached the bottom. Then the egg laying and honey gathering was started. Even before the cells were finished we discovered that the pollen season had arrived!

Bees came in with the pollen baskets on their hind legs fairly "bulging" with the yellow food. The interested boys and girls watched with amusement the dizzy nervous dance carried on by the workers in order to empty the pollen baskets into cells that are set aside for storing the food. One author called this the "wag-tail dance". Again from this seemingly haphazard procedure we found a definitely logical arrangement; the cells near the center were set aside for egg cells, and those next to them for food. The queen lays all of the eggs in these

special cells. The class was surprised to find that according to various authors, one queen could lay from 1500 to 2000 eggs a day. Of this number many would not hatch unless larva food or a drop of the pollen was put upon the eggs by the workers whose special duty it was to care for the eggs. When a drop of larva food is put upon the egg the white, worm-like grub emerges. We were not able to observe the egg-laying process as the queen preferred the inner sanctity of the hive, but one of the frames in which the scaled larvae in the cells were quiescent was removed until the complete change occurred from the cocoon stage to the adult. Each stage in the interesting life history is carefully guarded by definite workers.

The months of May and June are replete with interests for the bee lover. The fruit blossom season, in this locality, furnishes them with much nectar, especially the apple, peach, pear and cherry trees as well as the basswood.

It was not until September and October that the class could watch the bees cap each cell, sealing tightly the storehouses with a wax that prevents both water and air from getting in and spoiling the food.

This hive may be kept in the room during the winter months or may be moved out-of-doors, if moved only a few inches each day. At the end of the first year we waited until the first cold day and moved the hive from the second floor of our building to the third. The first sunny

day found many of the bees back at the second floor window. The class occupying the room was greatly disturbed. At once arose the question, "Was it memory or was it instinct which led them back to their old location?" We decided that it must be a process of association; familiarizing themselves with the objects of a definite location.

Last winter we decided to keep the hive within the room and watch the food supply closely, for we learned from the previous year that they require a larger amount of food while in a warm room and active. It was about the middle of February when one of the boys announced that he didn't believe there was much food left and he thought syrup should be used. A syrup of pure cane sugar was prepared by several of the girls and this was successful, but one day we put in a can of corn syrup, which resulted in a loss of so many bees that it will be necessary to restock them, to strengthen them for this season.

This study has stimulated wide reading, bringing into popularity many books and magazines. The students found such pleasure in it that they proceeded upon their own initiative to produce well-organized notebooks with fine accurate illustrations, booklets with clear scientific facts and artistic drawings and written articles and poems published in our school paper and literary magazine. These self-assigned creative expressions are such as only a real background of living material can furnish.

Using Old Chalk Boxes

NATURE study materials and devices in elementary grades are generally limited. We often are handicapped in knowing even what to do with our live specimens when we have motivated the child to bring these objects of interest to the classroom. To overcome this difficulty and others of the same nature we conceived the idea that it would be an interesting activity to make our own receptacles and observation boxes.

We looked about us. Lo! Before our eyes were our empty wooden chalk boxes. Why not use these and prepare for emergencies? We gathered twelve. The boys cut out three of the sides leaving only a small border to use as a sort of frame. In some we inserted fine mesh or screen. These were for the smaller insects and mammals. In others we used larger mesh for larger



THE CHALK BOX IN A NEW RÔLE

They make excellent "cages" for housing insects and small animals to be studied in the schoolroom

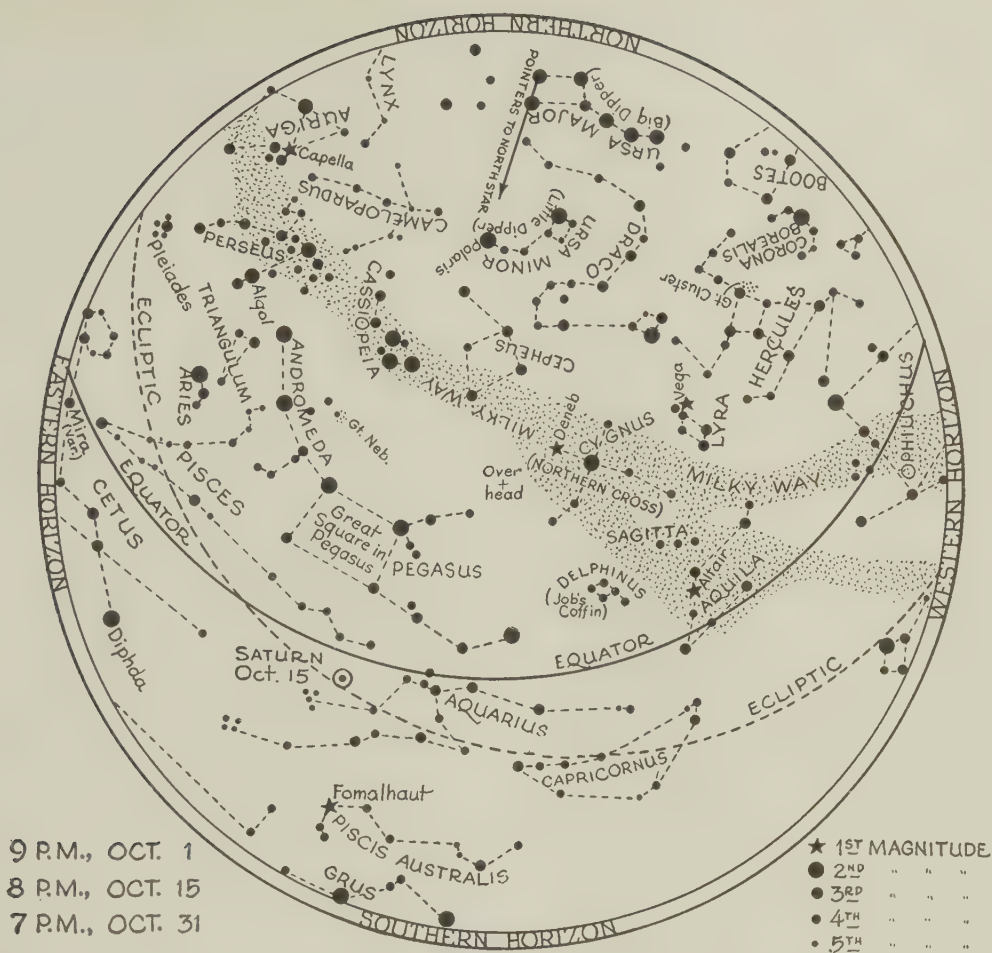
By MAMIE E. PAUL

Principal, Mt. Vernon School, San Bernardino, California

specimens. The boxes were placed so that the sliding lid would be at the top. The side we did not put mesh in served as a sort of shade for the creatures when we wished to place the boxes in the sun.

We painted the boxes with poster paints in colors that would harmonize with our room decorations. These happened to be green and yellow. The children became more interested than ever in Nature study and were glad to bring specimens to fill all the boxes. We collected everything from caterpillars to mice. By fastening the lid with a nail even the most harmful specimens were passed about without danger to the children.

It was not long until all the teachers in the building were borrowing our boxes. This activity proved helpful to the Mt. Vernon teachers. I hope it will be useful to others.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

The Harvest and Hunter's Moon

By ISABEL M. LEWIS

IN THE early fall, when the sun is near the autumnal equinox and the full moon, therefore, is near the vernal equinox, the interval of time between the rising of the moon on successive nights, when at or near the phase of full moon, is less than at any other time of year. As a result there is then moonlight in the early evening hours for a longer period than at any other season. The farmer, usually busily engaged in harvesting his crops until dark, finds this additional period of moonlight a great help; so much so that the full moon that falls nearest the time of the autumnal equinox has been called the Harvest Moon. The following full moon has received the name of Hunter's Moon because again the intervals between the rising of the moon on several successive nights were nearly if not quite as short as the month be-

fore and the additional period of moonlight was also a benefit to the hunter in his pursuits.

The reason for the exceptionally short interval of time between the rising of the moon on successive nights when near the full at this season of the year is that the moon's orbit lies close to the ecliptic and at this time of year the ecliptic makes its smallest angle with the eastern horizon. So on successive nights, the moon, although it has been moving steadily eastward, will be retarded less in its rising than at any other season of the year. The average retardation in the time of moonrise from night to night during the entire year is about 50 minutes but its range is very great and increases rapidly in higher latitudes. In the latitude of New York it ranges from about 13 minutes to 1 hour 20 minutes. The average retardation in the rising

of the Harvest or Hunter's moon in that latitude is about 22 minutes. In latitude 60° north the retardation in the rising of the Harvest or Hunter's moon may be only two or three minutes, so for several nights in succession the moon may rise at practically the same time each night. Within the Arctic Circle, of course, there are times in fall, winter, and spring when the full moon does not set at all, and during the same period the sun does not rise.

Although it is generally stated that the Harvest Moon is the full moon that falls nearest to the date of the autumnal equinox and that the Hunter's Moon is the next following full moon, this is not always so and in particular is not so this year. The Harvest Moon must also be that full moon for which the retardation in the time of rising is least. This year the date of the autumnal equinox falls on September 23. The full moon nearest to this date falls on September 30 and we would therefore expect it to be the Harvest Moon, while the full moon next following, on October 30, should be the Hunter's Moon. The retardation in the time of rising for these two full moons should also be the least of any in the year. Yet if we consult a table of moonrise for the year 1936 we find that the retardation in the time of moonrise for several days around the time of full moon is about 31 or 32 minutes in latitude 40° North for the full moons of August 3 and September 1, and, two or three minutes longer for the full moon of September 30, while the full moon of October 30 has a retardation in rising of nearly 50 minutes, no less than the average in fact, so that it is definitely ruled out as a possible Hunter's Moon. This would leave a choice of either the full moon of August 3 or September 1 as the Harvest Moon, or we might consider that we have this year two equally favorable Harvest Moons, one in August, the other in early September. The Hunter's Moon would fall, in that case, on September 30, a much more appropriate time than September 1.

Autumn is also the best time to observe the planet Mercury in the morning sky before sunrise because the ecliptic, near which its orbit lies, rises most sharply from the eastern horizon on fall mornings. On October 16 Mercury will be at its greatest western elongation. It will then rise nearly two hours before the sun and should be easily observable in the east before sunrise, and for a week preceding and following that date. Mars is also in the morning sky this month, in Leo. It is still at a great distance from the earth but will slowly draw nearer to it during the winter and increase in brightness. It is now of the second magnitude and, as always, reddish in color.

Venus, Jupiter, and Saturn are all visible in the evening sky this month. Saturn, yellowish in color and resembling a first magnitude star to the naked eye, is in Aquarius. It may be seen in the southeastern sky at sunset and is in view most of the night, setting about three hours before sunrise. Its rings are visible again, though they are seen at a very small angle because the earth lies only about three degrees above their plane. It is now in excellent position to observe with the aid of an ordinary telescope.

Jupiter is in the western sky at sunset, in Ophiuchus. It is at this time almost exactly equal to Sirius, the brightest star in the heavens, and is, next to Venus, the brightest object now visible in the evening sky. It sets about three hours after the sun during the middle of October.

Venus is now coming well into view in the evening sky at sunset. It far outshines all other planets and stars and will gradually increase in brightness and be seen at a higher altitude above the horizon at sunset during the fall and winter months.

The planet Uranus, just barely visible to the naked eye, cannot be found without the help of a star chart to locate its position among the stars. Its motion through the heavens is very slow because of its great distance from the earth. It has been in the constellation of Aries throughout the year. On October 30 it will be in opposition to the sun and above the horizon all night. Its distance from the earth at that time will be about 1,745,000,000 miles.

The planet Neptune, which is now in Leo, appears as an 8th magnitude star and can be seen with field glasses. Until the discovery of Pluto in 1930 it was believed to be the most distant object in the solar system.

Pluto can be seen only with the aid of powerful telescopes as it is a much fainter and smaller object than Neptune. Since the date of its discovery it has been in the constellation of Gemini and is now a few degrees south of Castor and Pollux.

In the latter part of July two faint, naked-eye comets were visible in the evening sky at the same time. Peltier's comet, which was a small nebulous object at the time of its discovery in May, became visible without the aid of a telescope early in July. Its tail was then more than a degree long and a fan-shaped streamer extended from its head in the direction of the sun. This streamer was finally absorbed by the sharp stellar nucleus in the head while the tail increased in size. Its nearest approach to the sun occurred on July 9 but its distance from the earth continued to decrease until Aug. 4 when it was only about 15,000,000 miles from the earth. It should then have been easily visible without the aid of a telescope but the light of the full moon blotted it out. A few days later it passed from the view of northern observers into the southern hemisphere, where it may be observed telescopically for some time. By the middle of August, however, a rapid decrease in brightness was expected to occur.

The second comet visible to the naked eye in July was discovered by Kaho, in Japan, on July 17, and independently by Kosik at Tashkent two days later. It was named Comet Kaho-Kosik. It was of the fifth magnitude when discovered. Since it was in the constellation of Leo Minor it was visible for only a short time after sunset. As its distance from both earth and sun was increasing when discovered, and as it was low in the west at sunset, it soon was lost to view. Once more those who had hopes for the appearance of a spectacular naked eye comet this summer were disappointed, but astronomers are used to this.

Answers to Our Questionnaire

By RICHARD W. WESTWOOD

Managing Editor, Nature Magazine

ONE THOUSAND, two hundred and thirty-two of our member-readers responded to our recent questionnaire on editorial policy. In fact, more than that have answered but when we came to the date for tabulating and analyzing the responses the number was 1232. These came from every State and from all the provinces of Canada, as well as some from foreign countries.

We appreciate sincerely this cooperation. The careful answers to the questions; the many helpful comments and criticisms; the interesting suggestions, all were of distinct value. We confess that we were happy to discover that in general the present editorial policies of the Association and *Nature Magazine* were approved by our members. Those who answered and those who did not will, we believe, be interested in a brief résumé of the replies to the questionnaire.

The first question asked was the length of time the person answering had been reading *NATURE MAGAZINE*. Many readers said with pride that they had been receiving it since the first number in January, 1923; others were equally proud of the fact that they have preserved, bound or unbound, every copy. We confess that we were surprised to discover that the average length of allegiance to the Association and its publication was five years and seven months.

We then sought to discover whether the interest of our readers had increased, decreased or remained about the same. One thousand and thirty-four of the 1232 answering said that their interest had increased; 56 said that it had decreased; 142 felt that their interest was about the same.

The next question asked readers to rate in the order of their preference the six general sections of the Magazine—general Nature articles, rotogravure section, conservation section, photographic department, hiking and camping forum and juvenile department. Some rated these sections by number from one to six; others rated more than one part of the magazine on an equal basis; some gave a rating to only certain parts. In tabulating this we assigned zero where no rating at all was given to one or more of the salient features of the magazine. We can best give you the results by printing the tabulation as follows:

	1	2	3	4	5	6	0
GENERAL NATURE ARTICLES.....	866	177	71	48	16	4	50
ROTOGRAVURE SECTION.....	469	345	202	74	23	8	111
CONSERVATION SECTION.....	364	181	232	161	71	19	204
PHOTOGRAPHIC DEPARTMENT.....	258	141	165	182	110	40	336
HIKING AND CAMPING FORUM.....	121	68	109	138	147	97	552
JUVENILE DEPARTMENT.....	140	40	79	110	97	158	608

In order to check on the proportionate editorial attention given to different subjects in planning the issues of *Nature Magazine* we sought to discover the degree of

interest in different natural history classifications. Major interests were indicated as follows: Birds, 986; flowering plants, 832; trees, 782; mammals, 623; conservation, 607; insects, 514; geology, 500; education, 499; astronomy, 493; fishes, 476; reptiles and amphibians, 442. Many, of course, were equally interested in more than one subject.

In our next question we sought a reaction to the present sixty-four-page magazine with advertis-

ing as against a forty-eight-page magazine with no advertising. The opinion was definite, 990 favoring the present magazine; 141 preferring the elimination of advertising; 201 venturing no opinion. Many declared the advertising to be a valuable part of the magazine, and others expressed appreciation of its high character and the absence of offensive advertising.

The next question was a rather difficult one to answer, asking as it did whether the reader knew of people who would like to join the Association and receive the magazine if the dues were two dollars instead of three. Four-hundred and nineteen avoided this question, while 420 said they did know people who would appreciate the opportunity to pay two dollars dues and 393 said they did not. Thus the answers to this question were about evenly divided.

In answering the next question nine hundred and seventy-one declared interest in informative articles; 765 liked records of original observations; 417 favored inspirational Nature essays. Here, again, there were many who liked all three types of material, or at least, two different types.

When we came to the question of using a limited amount of good original Nature poetry we found our readers taking exception to past editorial policy. Seven



PLANNING NATURE MAGAZINE

Left to right, Burke Edwards, assistant editor; Richard W. Westwood, managing editor; Edward A. Preble, associate editor and staff naturalist

hundred and ninety voted for poetry, 390 against and only 52 had no opinion. Some underlined "limited" and others underscored "good." So limited and good (we hope) will be the poetry in our pages in the future.

The Rotogravure Section came in for enthusiastic support. Eight hundred and ninety-nine want the section as it now is; 49 would prefer to have it entirely supplanted by articles; 183 would replace part of it with articles; 101 had no opinion.

The Conservation Department received amazing acclaim with only 29 people registering as not in favor of it,

while 1061 were for it and 142 had no opinion.

The Juvenile Section, unfortunately, came in for little applause, 479 finding it of interest; 367 being against it, and 386 not being sufficiently interested in it to answer the question.

This, then, is what our members and readers think and we will be guided by the wishes of the majority. We will hope to be able to carry some of the excellent specific suggestions as to certain types of articles and other features into effect. We thank sincerely all those who took the time to respond to our appeal for reader advice.

"Child of the Earth"

By ETHEL W. MUSGRAVE

ONE MAY live in the west for many years before catching a glimpse of the queer-looking insect shown in the picture, for, although it is quite common, it is shy, and nocturnal in its habits. Once seen, however, it is never forgotten because of its startling appearance.

In size it may vary from one and a half to three inches in length. Its color is a pinkish "sun tan," with black stripes running across the back part of its body which, though larger and smoother, somewhat resembles that of a wasp. Its most striking feature is its head, which is round and pink and as bald as a babe's, with markings on top that form a simple smiling face. It is this that suggests to the Spanish speaking people of the Southwest, who sometimes dig it from its earthen burrow, the name *Nino de la tierra*—child of the earth. The Navajo Indians find it in their country, also, and, with equal imagination, they call it *Woh-seh-tsinni*—"Old Man Baldheaded."

Few who see it realize that this strange insect belongs to the cricket family, although it has many cricket characteristics, and is sometimes called the Jerusalem cricket.

By day it lives in the earth, preferably in damp sand, but at night it comes forth in search of food. This consists of dead animal matter, roots and tubers. A piece of potato, a few inches of fleshy plant roots, some sand and a glass jar make an acceptable home for *Stenopelmatus*, as he is scientifically designated. Natural history students in the Albuquerque High School are said to have kept one in this manner for several years. Occasionally the sand



A QUEER INSECT WITH MORE THAN ONE QUEER NAME

Called "Child of the Earth" by the Spanish of our Southwest, and known to the Navajos as "Old Man Baldheaded"

was slightly dampened and a fresh root or two added.

Like others of the cricket family, the "earth child" is said to "sing" or "chirp". Like them, however, he does not make vocal music, but a stridulation produced with saw-toothed legs. To some people this is a pleasant sound, although the Latin word from which "stridulate" is derived—*stridere*, to creak—more accurately describes it.

It is not surprising that many superstitions should have arisen about this strange-looking insect. It is quite commonly believed to be highly venomous, and many a Mexican who finds his horse or cow dead from noxious weeds is firmly convinced that the unwary creature had eaten a "Child of the Earth" that had crept into the hay. As a matter of fact the insect is harmless and may be handled with impunity by anyone.

Nature Magazine in School

A Department of Aid to the Teacher

Goose Beyond the North Wind

This is a delightful story to add to one's collection of articles dealing with migratory birds. In October, when the fall migration is at its height, the study of birds is most interesting, and if the subject is continued through the fall and winter, when there are fewer birds, it is easier for the beginning student. Such problems as the following may be considered in connection with migration:

By what routes do birds migrate?

How far do they travel?

Which one is the champion?

How do they prepare for the long flight?

Which birds come first in the fall; in the spring?

At what time of day does a given bird migrate? Why?

How fast does it fly?

How far can it fly at one time?

How does it find its way?

What dangers do birds encounter as they migrate?

How can we make their journey safer?

Pupils can look up references in other issues of Nature Magazine, and consult U. S. Department of Agriculture Circular No. 363, on Bird Migration. (Sold for 10 cents by the Superintendent of Documents.) Other members of the class could write a play depicting the adventures of some bird, in which the class showed much interest. The snow goose would be an excellent subject as it would bring out the cleverness of the goose in outwitting his enemies.

Draw migration routes on a map. Keep lists of migratory birds actually seen by the pupils. In the late evening those who live in rural sections can listen for the calls of migratory birds as they fly overhead.

Plumes of the Forest

Evergreen trees have, to a high degree, the ability to live under adverse conditions. They are therefore often found growing in the less advantageous environments of poor soil, deep shade or windy hillsides. In this article some information is given concerning the special adaptations that make it possible for evergreens to live in these unfavorable locations. Before reading the article a trip should be taken to an evergreen forest and some specimens of different species of evergreens brought home for study. By handling the specimens it is easy to understand why the evergreen can live in regions where there are high winds. By careful observation of many young evergreen trees found within the forest, one can appreciate their tolerance for shade. In some cases they wait successfully for a hundred years before they penetrate the forest crown and receive full sunlight.

This article could also be used as a guide from which to make a map of the types of evergreens found in different parts of the country. From actual specimens and the pictures a key could be made by the pupils for use in the further study of evergreens.

In order that teachers and parents may further use Nature Magazine as an aid to the study of Nature and Science, this page is devoted to the following brief notes based upon articles in this issue and suggesting ways in which they may be used as a source of inspiration and information. To bring these Nature study thoughts to our readers we have obtained the services of one eminently qualified for the task, and this department is edited

BY ESTHER SCOTT

Instructor in charge of Elementary Science
Washington, D. C., Schools

Fungiphobia

Through the study of mushrooms and bracket fungi, pupils may be introduced to the less conspicuous and economically more important forms of fungi—molds, yeast and bacteria.

Life cycles in fungi differ remarkably in their speed from those of most other living things. This thought is developed on page 51 of Nature Magazine's *Guide to Science Teaching*.

The directions for modeling specimens of mushrooms would be easy to follow and could be used to advantage in the study of these plants. Enlarged models of yeast plants, molds, mildews, yeasts and bacteria could well be added to the collection, since models aid in giving a better idea of the true appearance of microscopic life.

The Smallest Flowering Plant

Duck meat or duck weeds would be a most interesting addition to the school room aquarium, were it not for the fact that goldfish like to eat them. These little plants do better when kept to themselves in a dish of water, or in a larger container. This article on duckweeds would be useful in presenting ideas on reproduction, since both asexual and sexual forms of this process occur in *Wolffia*.

Shellfish and Corals and Sponges of Early Seas

Life in the sea is a fascinating subject to persons of all ages. Collections of shells, corals and sponges may be easily made and many pupils will come home from their vacations with these treasures. A good way to get started on the study of sea life is to have an exhibition of sea shells.

Remains of sea animals found in some inland region will provoke such questions as: How did it get there? How long ago was it? Why has the sea disappeared? When such questions arise a class may be divided into committees, each committee having one or more questions for study. The current issue of Nature Magazine has considerable material bearing on this subject.

Last Year's Hornets' Nests

After frost has stopped the activities of the hornets, it is safe to bring their nests to school. The ones that contain larvae should be kept out of doors, except for short intervals for study. Class work could begin by listing all the questions asked by pupils concerning the life history of hornets and using this article as one of the references. The significance of instinct or intelligence is one of the important facts to be learned from a study of these insects. See page 96 of Nature Magazine's *Guide to Science Teaching*.

The Sea Birds of the San Juan Islands

Such articles as this should be read understandingly by older pupils if we as teachers have done our part well. However, we can not expect students to have a marked degree of sympathy for living creatures unless we have filled their school lives with happy experiences with these creatures. The subject of the balance of nature is one of national importance and is one fraught with great peril to many species. It cannot be taught too carefully, and teachers would find it worth while to follow the yearly suggestions under the heading "Balance Experience Realm", given in Nature Magazine's *Guide to Science Teaching*.

This article deals with a slightly different type of disturbance from that usually considered, but it fits in with those discussed on pages 65 and 66 of the Guide.

Much good can be done by writing letters to persons in authority and at least registering a point of view. Older pupils can do this.

Tent Caterpillar Control

An effective method of controlling the tent caterpillar is to destroy the egg masses from which next year's brood will hatch. The unsightly tents, spread about the roots and in the branches of trees in public parks, can be destroyed by community action. Individuals can collect the egg masses from their own property, but a community drive by school children or Boy Scouts is more thorough. Successful campaigns have been carried on in towns and suburban areas, according to the Department of Agriculture.

Dutch Elm Campaign

The two year war on the Dutch Elm disease has been intensified within the 50-mile radius of New York harbor, where the infection is concentrated, and in the outlying areas where a few diseased trees have been found, by a \$1,125,000 WPA appropriation. New Jersey, New York and Connecticut, where the disease is most prevalent, will continue to be the center of eradication activities.

Hiking and Camping Forum

Conducted by
ERNEST A. DENCH

Hiking and camping inquiries will be answered by mail if a stamped, addressed envelope is enclosed. Address the Forum editor.

YEAR'S BEST WEEK-END

The Forum editor is personally conducting a Columbus Day week-end hiking trip of three days in the Southern Taconics, 121 miles from New York City. There will be moderate daily walks of from 6 to 8 miles. One will be to Mount Everett, 2604 feet, and the second highest in Massachusetts. Overnight headquarters will be at a unique rustic establishment known as Jug End Barn. In this semi-high peak region he has carefully selected climbs of moderate grades, such as can be comfortably made by beginners in fair physical condition. Forum editor regards this trip as the highlight of his 1936 scouting efforts. The cost per person will be \$15.00 from New York City—and this will include everything. Particulars sent on receipt of a stamp.

Hostels in Canadian Rockies

The completed chain of Canadian Youth Hostels has terminals—Calgary and Banff—easy to reach by train, bus or auto. Daily "jumps" on this 120-mile chain in the foothills of the Rockies vary from 10 to 20 miles. The accommodations accord with the spartan ideals of the hostel movement. At Jumping Pound (Alta.), for instance, hostellers occupy two Indian teepees on the banks of a river. A covered wagon and a tent are the hostel facilities in the village of Morley. One of the High River hostels is only 10 miles from the ranch which King Edward VIII acquired while Prince of Wales. A tent pitched on the back lawn of a suburban home is another hostel.

Organized transportation to penetrate the interior started with a private auto leaving Calgary each week-end, but there is now a truck running on a fairly regular schedule. Formerly week-enders were restricted to the hostels on the outskirts of Calgary and Banff.

A secondary chain to the north, but running east and west, is contemplated from Edmonton to Jasper Park. Trails between Jasper Park and Banff will link the two chains, enabling a greater distance to be covered without retracing one's steps.

Why traverse only the foothills when in a high peak region? Canadian youth hostel executives carefully reviewed all aspects of location before making their choice. They decided that the beautiful foothills yield sufficient scenery and climbing to interest

the average hiker, horseback rider and bicyclist.

There are far fewer mountaineers because the qualifications are immeasurably more exacting. Hostellers who wish to indulge in Alpine climbing will be provided with the necessary introductions to the Alpine Club of Canada.

Until recently these foothills trails were known only to a few people apart from the natives.

The Canadian Youth Hostel Association is not, as yet, part of the International affiliation, so a separate membership is required. An annual pass costs 50 cents to those under 21 years; to all others it is \$1.00. Overnight charge of 25 cents obtains a bed in some cases, and a paillasse on the floor, in others. Each hosteller is expected to bring a light sleeping sack or sheet. CYHA secretary is Miss Dorothy Allen, 212 12th Ave., N.W., Calgary, Alta.

October Gadget List

1. The latest night visibility protection for the highway pedestrian or bicyclist is a black cowhide leather belt. Several styles and sizes, for arm, wrist or shoulder. Belt is studded with a continuous row of white light reflectors, very conspicuous on dark nights.

2. A rich, concentrated southern ham filling, of which a little goes a long way. A sandwich can be made for from 4½ to 10 cents, it is claimed. Packed in small jars. Free circular gives recipes for sandwich combinations, hot and cold.

3. A new sport fishing apron is adapted to the picnic or campfire supper undertaken by auto, and for which ordinary sport clothes are worn. Apron is of 8" standard khaki duck. Two commodious patch pockets to hold culinary tools. Sheepskin swatch serves as an emergency wiper.

4. Current catalog of an old-established stove and range manufacturer lists several wood-burners, suitable for cabin or shack.

5. A camp stool which opens or folds up in a jiffy; nothing to monkey with. 4 firm legs and a tarpaulin cloth seat. Choice of several colors.

6. A leather dressing in liquid form which will keep shoes soft, and is even effective on wet leather. It comes in 1-pint cans—the easy-to-spill kind—so each application should be poured into a saucer, and applied to the leather with a brush or cloth.

7. One disadvantage the Forum editor has experienced with the new sport belt made of interlocking metal chains is that it tends to rip the belt loops of breeches. He is therefore glad to recommend a belt woven of elastic cord, very flexible and non-damaging to breeches.

8. A firm with a high reputation for its tooth brushes offers a foot brush. It has nine rows of black bristles, a polished wooden back, and a reinforced linen strap. Fine for scrubbing your feet after a dirty trail or camping trip.

For further details of the above products, send for the October Gadget List, enclosing a self-addressed stamped envelope.

Katahdin a Long Way Off

The Mitchell brothers, disguised with luxuriant beards, emerged from the Appalachian Trail in the Skyland sector of the Shenandoah National Park. At this point Mrs.

C. Bradford Mitchell was on hand with an automobile.

In a little more than seven weeks the Mitchells had covered approximately 850 miles of the southern A-T. This average of 16 miles per day was done with a 30-40 lb. pack, and included the hard, high climbs of the Smokies.

The brothers performed a genuine service to the Appalachian Trail Conference, as they reported on the existing condition of southern trail sectors and shelters. At some future time they plan to do the remaining 1200 miles.

End-to-end users of the A-T will always be few and far between. The time factor—an estimated minimum of 200 days—confines the trip to gentlemen of abundant leisure. There is always the possibility of sickness or an accident.

Myron H. Avery is no swivel-chair trail executive. He has traversed—not continuously, but at different times—virtually all parts of the A-T. There is a trail tool cache located in the garage of Avery's home in suburban Washington. There is no sign here to the effect that—"The man who loans tools is out." The garage is a busy place over week-ends, when more than 100 tools are often in service among Potomac Appalachian Trail Club workers.

Pacific Crest Trail Publication

A primer for the naturalist interested in the Pacific Crest Trail System has been compiled by Clinton C. Clarke, 125 S. Grand Ave., Pasadena, Cal. This handy pocket size booklet sells for 50 cents.

Camp Cookery Booklet Omissions

Despite the thoroughness with which the booklet on *Cookery in Camp and on the Trail* (copies still available at 10 cents each from the American Nature Association) was prepared, the Forum editor has had several unintentional omissions called to his attention.

Under "Camp Cookery Books For the Library Shelf," add the following:

BOYS' BOOK OF CAMP LIFE (Elon Jessup). \$1.00.

BOYS' BOOK OF CANOEING (Elon Jessup). \$1.00. Contains a canoe camping chapter.

CAMP GRUB (Elon Jessup). \$3.50. An outdoor cooking manual.

All three books bear the publishing imprint of Dutton's.

Under "Cook Stoves and Accessories," add the following: SWEDISH OPTIMUS CO., INC., 35 Pearl St., New York, N. Y. OPTIMUS CAMPINGO; portable kerosene or petrol burning outdoor cook stove; 1 burner (5½ lbs. model); 2 burners (10 lbs. model); packs in a green tin box with carrying handle.

Where Are St. Louis Clubs?

Intended to function as a trail and hostel administrative organization, the Missouri Walk-Ways Council has been forced into running conducted trips. Contacts with more than 600 St. Louis hikers and campers showed the acute need of clubs.

Secretary Karl G. Johanboeke hopes that this departure from the Council's original

(Continued on page 252)

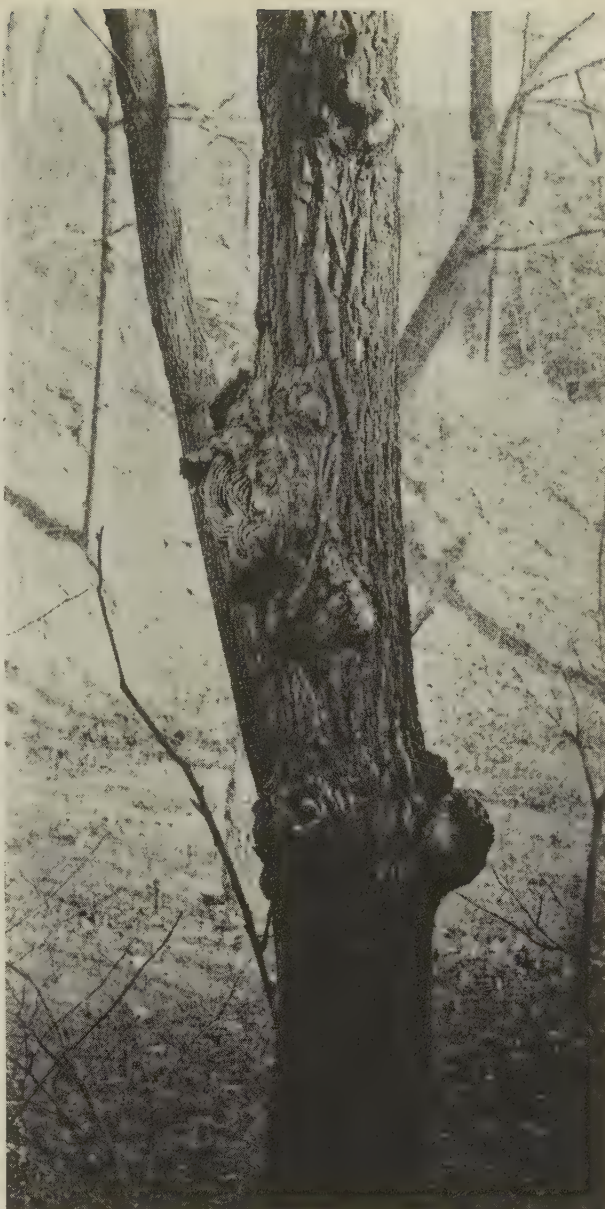
A Fight for Life

By ANDREW LESTER

BY A strange anomaly of Nature, plants, which are a necessity for our life, may also bring about its destruction. These destructive plants, mostly microscopic, even kill members of their own tribe. Of course that is not strange when we think that healthy, lovable men line up to shoot other healthy, lovable men. When small plant forms, such as fungi, attack other plants, they do not spare the largest and sturdiest of all plants, trees.

The accompanying pictures show the struggle of a black walnut tree against a certain insidious fungus enemy known as *nectria*. The disease is a canker. Walnut trees seem to be particularly susceptible, but other trees, including apple, are attacked also. The tree here is still living after a long struggle against a powerful destroyer. Its home is in a western Pennsylvania woods near the base of a steep hill, close to a small stream. There are twelve cankers on it, five open and seven that have not broken through the bark.

Some students of canker tell us that there must be an injury or abrasion of the bark to allow the fungus spores to get started in the cambium, or growing part of the tree. The oldest canker is obviously more than forty years old and the younger ones seem to be more than eight years



THE AILING WALNUT TREE

At the left the largest of the cankers, against which the tree has been fighting for forty years

old. Injuries may have occurred in other ways than by felling trees or logging. There are several walnut trees in this locality, but only one other shows evidence of canker attack.

From an examination of the growths of the largest of the five open cankers, it appears that, after the bark first gave way, the first out-turned layer was made when the tree was young; a mere sapling. The age of the canker can be approximated by counting from the innermost growth outward, and estimating a year for each layer. The tree is about thirty feet tall and fourteen inches at breast height. When a canker forms, it seems that the cambium layer produces more tissue than is normal in an effort to heal a wound. This may correspond in a way to what happens in our bodies when the white corpuscles collect in great numbers to combat an infection. This tree will sooner or later have to give up the struggle.



Hiking and Camping Forum

(Continued from page 250)

plan will be only a temporary one, until such time as local clubs are established.

Field headquarters are in the Cuivre River Recreational Area, now being developed by the National Park Service. This tract of some 50,000 hilly acres will provide plenty of hikes without too frequent repetition. Eventually there will be adequate overnight camping facilities in hostels and lean-tos.

Oklahoma Camping Base

The Kiamichi Mountains, part of the Ouachita range in southeastern Oklahoma, are recommended to the camper in quest of new and attractive locales. The *Official Highway Map of Oklahoma*, free from the Highway Commission in Oklahoma City, is what you need for driving down there, in conjunction with U. S. Geological Survey maps.

Near Broken Bow is a state game preserve of some 16,000 acres—all virgin white oak, ash, hard sugar maple and giant holly. State Game Warden L. D. Hickey states that not a stick has been taken out of it. While no camping is allowed inside this area, at the entrance, on the beautiful Mountain Fork River, are several small, unfurnished but screened cottages in fair condition for occupancy. They may be occupied by campers for indefinite periods without charge. It is a case of first come, first served. The superintendent, who lives close by, has the keys.

The area could be explored on one-day trips from the Mountain Fork base. The country is sparsely populated. Some good views are to be had from the pine-clad summits. Most of the climbs are easy ones, over newly-built trails or fire lanes. The highs here range around 2000 feet.

Have You Tried Charcoal?

It was a wet day, and the campfire supper rendezvous was under a natural awning—a large rock ledge. Previous experience in using this site, scarcely two miles by a well-worn trail, taught us not to expect observance of camping ethics by recent users. When we arrived, to find not a stick of wood under cover, we congratulated ourselves on hauling a bag of charcoal.

Two hours were available in which to hold the campfire supper, and had we depended on the dead but soaked wood in the vicinity, most of the time would have been squandered getting the fire going.

To speed up things we made two small fires, starting both with newspaper and small quantities of charcoal. We built a circle of stones around each fire, and had coals in a short time. We inserted four one-half pound pieces of round steak in a large hand grill and laid the grill flat on the stones over the coals. The four diners expressed satisfac-

tion with the steak, while the other fire held, in turn, the soup pan and the vegetable pot. The coffee was brewed over the first fire after the steak was done.

New Glacier Park Book

An entire chapter of *High Trails of Glacier National Park* is allotted to the Black-foot Indians and their past and present park associations. The camper will pick up a few wrinkles on tepee construction.

Margaret Thompson purposely avoided a matter-of-fact guidebook. She had in mind those who have the leisure—and the good taste—fully to explore the Park and sip its beauties. The "gulpers" are the one-day tourists.

The author unnecessarily apologizes for certain peaks being accessible by good trails. The anti-trail climbers are in the minority, anyway, and it is doubtful, even in these days of alleged improvements to primitive areas, that trail systems or fire lanes will reach out to every peak.

Miss Thompson is partial to alternate days of walking and horseback riding, as "one will counteract the soreness inflicted by the other."

Those who wish to get off the beaten path should go to Kintla, in the Park's northwest corner, where peaks rise higher above the valley floor, with a brace of formidable glaciers tossed in for good measure.

The Caxton Printers (Caldwell, Idaho) are noted for their distinctive bookcraft—and this \$3.00 book will enhance any library collection. There are two maps, one an insert, and the other an aeroplane relief type in colors. Part of the adjoining Waterton Lakes National Park of Alberta is given on the latter map. Other illustrations are 14 full-page photographs and reproductions of three paintings in colors.

Much Ado About Corn

W. W. Cady, light-weight camper extraordinary, is disturbed because the Forum editor published a three days' food list approved by a certain club. The innocent cause of the trouble was a can of corn. Tasty, yes. Nutritious, yes. The can reposed in the pack until the last meal on the third day.

Cady has nothing against canned corn as a food item, but he does rebel at carrying it, even for only a few hours, when, according to his palate, either dried or parched yellow corn will serve just as well. Parched yellow corn makes an excellent iron ration, if eaten straight with salt.

The Forum editor is in a quandary. He will not be able to look Cady straight in the eye the next time their trails and campsites meet. Another incident on the horizon concerns a western milling company which is trying to lessen the camper's meal planning problems. This firm knows that many a camper is at a loss to know what to serve for that most exacting and trying meal—the last one on the last day of the trip. Quite innocently a recipe is given for frizzled chipped beef and corn—the canned kind. At the risk of receiving another page of narrow-gauge typing from Cady, the recipe is given: Fry one-quarter pound of chipped beef in three tablespoons of fat. Cook until it curls. Beat two eggs and add to one can of corn. Stir into meat and cook until eggs are set and corn is thoroughly heated. Sea-

son with salt and pepper. Onions may be added if desired.

Never mind; if there are other canned corn toting rebels, our trailer coach friends may like to try the tasty dish.

They Started with Noonmark

The time was September, 1897. The place was Noonmark Mountain, 3552 feet, which three Adirondack enthusiasts had climbed by an overgrown trail, walking around and over fallen log entanglements. This gruelling experience influenced the three walkers to consider ways and means of trail maintenance—and the Adirondack Trail Improvement Society came into being.

Thirty-nine years later finds the ATIS custodian for over 100 miles of Adirondack trails. Among them are trails to the summits of ten high peaks, each more than 4000 feet. High peak trails in the hands of other organizations are New York State Conservation Commission, 7; Adirondack Mountain Club, 3; Lake Placid Club, 2.

Partly to commemorate the efforts of these early pioneers, and partly to introduce others to the charms of Noonmark, the society recently published a booklet, *Noonmark, Its Flora and Fauna*. Alice E. Johannsen is frank in pointing out that—"Noonmark is not one of the High Peaks of the Adirondack Mountains—not one of the 46 mountains more than 4000 feet—but it imitates in miniature their rugged characteristics. The top is bare rock and the view superb. A leisurely ascent may take two hours. Nearly all species of trees, plants and fungi of the Adirondacks are encountered on the way up, and usually deer and other animal life. Even black bears are sometimes reported near the summit scuttling into the woods." Noonmark is located on the edge of the Adirondack reserve, about four miles from Keene Valley.

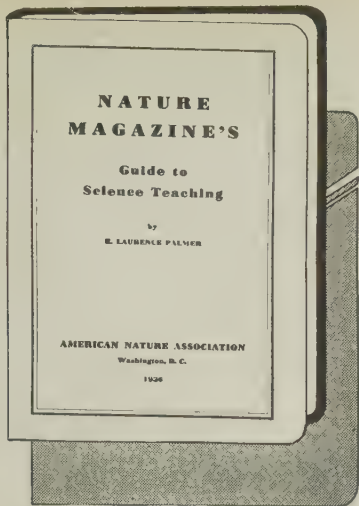
In addition to its trail activities, the society lays aside a reserve fund for the prevention and control of possible fires in the St. Hubert's and Keene Valley sectors.

Through the years the society has been generously supported by the summer residents. It now has 163 members. An individual membership costs \$3.00 yearly, but any club may join as a body for \$5.00 per annum. Principal officers are Henry Goddard Leach, president; and Henry R. Hayes, treasurer. Mr. Leach's address is 170 E. 64th St., New York, N. Y. A booklet of Adirondack trails is in preparation, replacing the 1933-4 circular.

Winter is Coming—Brrrr!

A winter camping party, to avoid the haulage of big loads over snowy ground into the interior, had arranged for periodic deliveries of food by airplane. It so happened that location directions were not specific enough for the aviator. The place he thought was the right cache was actually several miles off the course. He dumped his precious cargo without landing, as the rocky terrain made it too risky to come down.

The campers were in dire straits when the expected victualing replenishments failed to arrive. They eked out their emergency rations, hoping against hope to hear a motor in the sky. Taking the shortest possible route back to civilization, they accidentally came upon some of the mis-delivered food. Much



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"I think that in general it is a very fine piece of work. It is very valuable for showing how otherwise unrelated pictures and experiences may be used for particular purposes, thus preventing the work from becoming haphazard and incidental." Dr. Victor L. Crowell.

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HIKING AND CAMPING

(Continued from page 252)

of it was badly damaged, as the supplies had been packed into heavy, bulky containers.

The chief camper made it his business to visit the airport as soon as possible after the trip. He had the good fortune to meet a visiting aviator—a man with expedition experience in cold climes. The camper delivered a lot from this aviator. He was advised, when camping on the ice or in the snow, to dye the tents either orange or cerise. They are then easy to identify from the air against the white landscape.

The camper was also counseled to employ a simple code, using strips of orange or red cloth. With three strips, each roughly 8' long by 18" wide, the letter H for "Help" could be formed on the snow or ice. The same strips could be shifted to compose the letter K, for "Okeh."

The correct technique of airplane food deliveries is to tie the food into parcels of from three to four pounds each, with a colored streamer adhering to each parcel. Even if no campers were present at the cache, the colored streamers would enable the aviator to judge if the packages were registering.

(Adapted from an article in the *New Zealand Alpine Journal*.)

Onward Rambled the 654

A British railroad advertised conducted rambles at certain attractive places along the line. No less than 654 knapsack adherents showed up one beautiful fall Sunday morning. Sixteen leaders were in readiness, and went through the coaches flourishing type-written sheets of their respective itineraries. You made your choice and left the train at one of the three country stations. Here the leaders put up their banners, each with its trip number. You took your place, and the groups started off with a minimum of confusion. Who says there is no such thing as British efficiency?

Wisconsin Trip Possibilities

Wisconsin's highest point is Rib Mountain, 1940 feet, located in the State Park of that name. A highway runs to the summit. This park contains a splendid system of footpaths, while camping is permitted at designated places. There are rocky escarpments and quartzite oddities. Nearest city, Wausau, is 6 miles.

According to the booklet on *Among the State Parks and Forests of Wisconsin* (free from Wisconsin Conservation Dept., Madison), the state's finest mountain scenery is contained in Devil's Lake State Park, near Baraboo, in the Baraboo Hills, which are rocky bluffs above the lake. Camping is allowed.

Northern State, 140,000 acres, is the largest of the four state forests. It is in northeast Vilas County, reachable by rail or auto. Rolling country at about 1600 feet elevation, dotted with some 150 lakes, on many of which camping facilities are provided.

Wisconsin also has two National Forests, Chequamegon and Nicolet. Correspond with Regional Forester, Federal Bldg., Milwaukee, as to recreational privileges.

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Slogans for Preservation

By Effie M. Patterson

If properly trained and stimulated while young, today's children will become the conservationists of tomorrow. The Colorado Mountain Club was organized to stimulate interest in Nature and to encourage the preservation of forests, flowers and animals among our pupils.

Before Arbor Day the school children were asked if they would like to enter a contest sponsored by the Mountain Club. Of course they were eager to know more about it, and their enthusiasm as well as the response was all that anyone interested in Nature work could desire. They entered into the contest whole-heartedly. The object of the contest was to write conservation slogans. After being written, they were read to the class and voted upon. If there was a close second, that slogan was also selected as one of the best to be sent to the judges. From five to ten of the best from each grade were submitted to the Nature Protection Committee of the Fort Collins branch of the Mountain Club.

These slogans are representative of the best:

"Fires are such fun to make,

But wouldn't you hate to see them take
Our trees, that stand so tall and strong,
And flowers that grow so very long?"

"God was loving and gave us flowers;

To make them grow He gave us showers;
Since God was kind and gave us them,
We should leave them on their stem."

The Mountain Club's Nature Trail, about three miles long, begins at the entrance of the Fort Collins Mountain Park in Poudre Canyon and leads to a refreshing spring at the top of Mount McConnell. The trees, shrubs, rocks and flowers to be seen along the trail are labeled. Beautiful views of the canyon gorge of the Little South Poudre River, snow-capped Clark's Peak, Hague's Peak, and Mount Baldy, as well as the highway winding along the canyon can be seen.

The slogans of the school children were desired by the Nature Protection Committee to be posted on their trail to help in the conservation of birds, flowers and trees; but this idea might well be used elsewhere to aid in the preservation of the many things Mother Nature has given us.

Yale's Collection Grows

Progress in tropical forestry and the world-wide study of woods by the Yale Forest School is noted in a recent report made by Yale University. The school's wood collections now contain more than 32,500 specimens, representing more than 10,400 named species of 2548 genera and 225 families. The additions during the last two years alone almost equalled the total number of specimens on hand a decade ago. A recent valuable addition was a gift from the Commercial Museum of the Colonial Institute of Amsterdam. It consisted of 2215 Javanese woodspecimens collected with herbarium material by Koorders during the years 1888-1894.

Too Many Roads

The Commonwealth Club of California wisely has adopted a resolution that "Cal-

fornia's undeveloped high mountain areas have been reduced dangerously near to a minimum for the welfare of the State, and that no further intrusions by the building of roads should be allowed without convincing proof of public necessity."

The resolution, passed by the Section on Forestry and Wildlife of the Club by a fifty-seven to two vote, was overwhelmingly endorsed by the entire club membership 650 to 70. Section Chairman L. A. Barrett in presenting the findings to the Club said that "a region once opened up by roads can never be closed. On the other hand, areas kept closed now can be opened by future generations if it becomes necessary to do so."

He pointed out that out of a National Park and National Forest Area of more than 20,000,000 acres only 600,000 lie more than ten miles from an existing road and that although the National Parks and Forests contain only one-fifth of the state's area and one-one-hundredth of its population, they contain one-fourth of the mileage, he said.

"The ultimate pattern of the California mountains, unless the present trend is checked, will be made up of roads, excessive development, poor hunting and fishing, and a large body of exploiters," Mr. Barrett declared. "Just a few more years of hesitation and the only trace of that wilderness which has exerted such a fundamental influence in moulding American character will be in the musty pages of pioneer books and the mumbling memories of tottering antiquarians."

Ohio's Hat is in the Ring

We are happy to report the formation of the State Federation of Nature Clubs in Ohio and to congratulate Mr. Edward Sinclair Thomas, Curator of the Ohio State Museum of Natural History on being elected first president. Praise also must go to the Wheaton Club of Columbus for their work in sending out the call to all Nature study clubs throughout the state asking them to send their delegates to the meeting that resulted in the formation of the Federation.

Fifteen clubs sent fifty delegates, representing Toledo, Mansfield, Canton, Cincinnati, Athens, Delaware, Dayton and other cities. Mr. Arthur R. Harper, "keynoter" for the convention, pointed out that if the destruction of wild things in the state continued "the only naturalist who can view the situation calmly will be the astronomer, who may rest assured that the objects of his study will not meet with destruction."

The federation, he said, would be for the purpose of collecting and disseminating knowledge, to assist the members with the problems, and "to spread appreciation and knowledge of Nature far and wide until so many have learned the better philosophy of Nature and Nature's God that no man or organization of men will dare raise a hand to despoil or destroy it."

This, in Mr. Harper's opinion, "is the only way to restore Noah Webster's definition of Conservation to the dictionaries of Ohio." It should be added that this is the only method of restoring conservation to the dictionaries of any state. We urge other communities and states to follow Ohio's excellent example.

Bluejays Again

Proponents of the bluejay's useful qualities have been conspicuous by their absence

since the publication in our June issue of Wayland E. Mills' note "Why Harm the Bluejay?" M. E. Nelson, of Malden, Mass., reports that he was much interested in Mr. Mills' story but that he "must strongly disagree with him." Mr. Nelson cites two instances, both of which occurred in his own back yard, in which baby robins were carried away by thieving bluejays. Only once, he writes, was he able to save part of the robin family by standing on guard and frightening away the marauders.

Oscar

By Josephine D. Kessler, Jr.

One day, while washing windows and trimming the vines that grew too close to the glass, I unknowingly cut down a humming bird's nest. When discovered the next day, only one of the two babies was alive. I took him into the house and immediately began feeding him with a medicine dropper, and, since I was unable to be at home during the day, I gave him to some friends to keep. In a short time he became so friendly that he would sit on our hands and shoulders to have his head scratched. One of his favorite pastimes was bathing in a tablespoon of water. After keeping him for two weeks, we set him free in the yard. It was a dreary day, however, and Oscar had not learned to hover over the flowers while extracting the honey. Our friends therefore decided to keep him another week, but he died in a few days. His passing was mourned by everyone, as much as though he had been a family pet for many years.

New Primitive Areas

National Forest land on the Olympic Peninsula in the state of Washington totalling 28,930 acres has been designated as the Olympic Primitive Area by Secretary of Agriculture Wallace. This region is to be set aside as a perpetual wilderness and maintained as near as possible in its primitive state. This is a major step in adequately safeguarding recreational and aesthetic values of the region and preserving outstanding areas of virgin timber, without, however, endangering the economic life of the peninsula which is largely dependent upon timber resources. The boundaries of the new area expand the former Primitive Area by the addition of territory lying south and east of the Mt. Olympus snow peak district.

Dunking Birds

Unmannerly birds that "dunk" their bread have been discovered by Mr. M. Pfeffer, a member of the Webster Groves, Mo., Nature Study Society. Bronzed grackles, discovering the bread in their feeding station too hard for their consumption, carried it to the bird bath where they soaked it until soft enough to eat.

Deer Doctor

Medical science has come to the aid of a buck deer near St. Ignace, the Michigan Department of Conservation reports. In an encounter with dogs, the buck received a broken hind leg. Dr. W. C. Edmison set the leg and placed it in a cast. The cast was recently removed and it is believed the deer will be able to use his leg again in a short time.



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Hardy Fruit Cyclopedica

U. P. Hedrick, vice-director and horticulturist of the New York Agricultural Experiment Station, has compiled a *Cyclopedica of Hardy Fruits* that will be a welcome addition to the library of any botanist. The book was written to aid in the identification of varieties, to serve as a guide in the choice of them, to state in what region they grow best and to stimulate the desire to grow better fruits. It is a volume intended primarily for fruit growers, nursery-men, county agricultural agents and students in colleges and high schools.

Indians at Work

We are pleased to note the appearance of *Indians at Work*, published by the Office of Indian Affairs, Department of the Interior, in printed pamphlet form. The value of the publication, containing news of interest to Indians, is greatly increased with the adoption of this new printing policy. The pamphlet formerly was mimeographed. The current issue, the reorganization number, contains information on the political organizations formed recently by the various Indian tribes. It is amply illustrated with photographs and presents a concise picture of the activities of Indian life.

New Sanctuaries

Nine new wildlife sanctuaries have been created by the Michigan State Conservation Commission, which has closed them to hunting and trapping for a period of five years. These havens are located in nine counties, the largest being Lapeer County's 1300 acres. It is apparent that Michigan is cognizant of their wildlife situation and is making an honest attempt to preserve it.

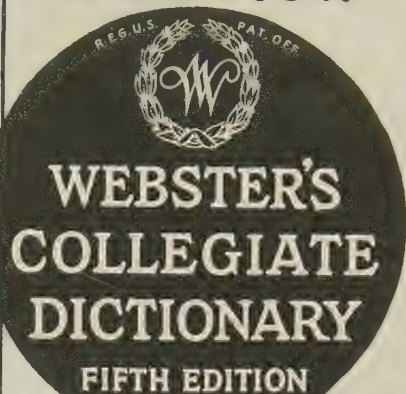
A New National Forest

The Croatan National Forest, in the tide-water and coastal plains region of North Carolina, has been established by Presidential proclamation. Because of the extent and location of this region as a potential lumber producing area and the need of a National Forest for demonstration purposes, the Forest Service has planned important undertakings in forest management in the new unit. The area of the forest is 14,417,000 acres, three-fourths of which are potentially productive forest lands.

New Sport Magazine

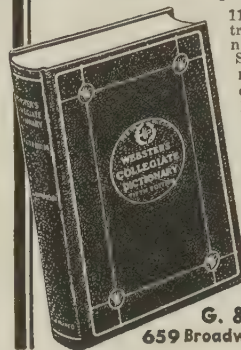
Another magazine was added to the list of sportsmen's publications with the appearance of the August issue of *The Southern Sportsman*, edited in Austin, Texas, by J. Austell Small. In general the first issue follows the formula of the other hunting and fishing magazines although it is somewhat more brightly written than most of its older contemporaries. There is no indication whether this newcomer will adopt a progressive attitude toward wildlife conservation because the editorial is devoted to the trials and tribulations of the editor in launching this first child of his brain. (We sympathize.) We hope that *The Southern Sportsman* will have the courage to face the facts of wildlife decline and to champion enlightened sportsmanship. If any section of the country needs such leadership it is the South.

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With Our Contemporaries

Rocks and Minerals, the journal of the Rocks and Minerals Association, has in its August issue a fine article by George M. Colvocoresses on the Arizona Meteor Crater, to some people just a hole in the ground but to geologists one of the most interesting spots on earth. Joseph W. Howard, professor of Chemistry at Montana State University contributes "The Search for Sapphires," an interesting article on the mining of this gem.

The National Association of Audubon Societies, in *Bird Lore* for July and August, present their usual well-written conservation articles. "Save the Bald Eagle," by Francis H. Herrick, stands out as an excellent presentation of logic that voices our own opinions. Of course when Dr. Herrick writes about eagles one hears from a leading authority who has devoted a lifetime to the study of our National Bird.

Interesting articles in *The American Botanist* for July include "Wild Flowers of the Prairies," by Mrs. H. P. Magers, and "One of Nature's Puzzles," by James E. Cook, the latter being an attempt to solve the question of "which came first, the leaf or the flower?"

The July *Zoonooz*, published by the Zoological Society of San Diego, contains three articles on unusual animals, including the tapir, and the babirusa, a strange member of the swine family from the Celebes Islands.

The leading article in the August *Journal of Mammalogy*, published by the American Society of Mammalogists, is an excellent account of observations made of the Florida marsh rabbit by W. Frank Blair in the vicinity of Gainesville, the Everglades and in Dade and Gadsden Counties. Mr. Blair makes acknowledgment to the University of Florida, members of the Department of Biology of the school and others for their assistance in compiling observations of this interesting animal.

The September issue of *Scientific Monthly* contains, among other interesting features, a significant group of observations by Dr. Walter P. Taylor on "Some Effects of Animals on Plants."

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Photographic Notes

BY SAMUEL BROWN

November

As the beautiful colors of October fade into the browns and dull carmines of November, we are presented with new photographic possibilities. Both the countryside and the city park offer delightful aspects of familiar subjects, and as the month draws to a close, the trees laid bare by the winds become fascinating game for our cameras. New perspectives add charm to the leafless trees, and where we have these in combination with a pool or a stream, we find excellent material for picture making.

For those who appreciate real beauty, there is an indescribable grace and loveliness in the form of leafless branches and twigs. The masses of foliage and shadows have gone and in their place we have delicate lines that, when photographed against the sky, make interesting black and white designs.

The writer recalls a happy excursion late last autumn. The day was dull and did not promise any interesting photographic opportunities, but in the hope of finding some good subjects, a friend and I walked to a nearby park which we felt had already lost every photographic possibility during the summer and early autumn. As we walked along the bank of the familiar stream with the sun at our backs we were attracted by the design drawn by the bare branches against a dull gray sky. The low falls, un-



BARE TREES AND BRANCHES MAKE INTERESTING SUBJECTS FOR THE NOVEMBER PICTURE-SEEKER

filters as they are almost always subjects with sufficient contrast.

The pictorial value of our pictures will be considerably enhanced by following a few simple rules for good composition. It is first necessary to choose the subject of chief interest and make that stand out, subordinating any other details that are present inside the picture area. Careful selection of viewpoint will permit some control of the lighting. Try to distribute the light and

photographing any particular subject. The size and type of the camera being used, light conditions, color of subject and the final result required must be taken into account and the choice made accordingly.

In order to simplify the analysis of the many emulsions available at the present time, we are grouping them under three general headings, namely, *regular*, *orthochromatic* and *panchromatic*. Regular film was almost universally used till about 1931



LATE-AUTUMN SCENES SUCH AS THESE MAKE EXCELLENT SUBJECTS FOR THE CAMERA. ALL PHOTOGRAPHS TAKEN ON VERICHROME FILM, F8, EXPOSURE 1/30 OF A SECOND

attractive at earlier visits, seemed to beckon as did the distant bridge. As we turned again toward the sun, homeward bound, the trees, spreading a screen of branches over the stream, drew our attention, and two shutters clicked almost simultaneously. That cold November afternoon yielded pictures that would have been impossible at any other time.

Toward the end of the year the light gets weaker and it is necessary to use a faster film or a larger diaphragm opening, or both. Since shadow detail is important a good orthochromatic or panchromatic film is recommended. A tripod is useful when, because of poor light, a long exposure is required. Late autumn and early winter scenes do not have to be photographed with

dark portions so that the picture will be balanced. Always remember also that simplicity in arrangement of subject matter generally makes the most attractive pictures. November passes all too soon, so get your cameras busy and take advantage of Nature's November beauty.

The pictures reproduced herewith were taken with a National Graflex camera by the author.

Films

There are several factors to be considered when deciding on the film to be used for

when *orthochromatic* film was introduced, which was followed about two years later by *panchromatic* emulsions.

Regular film is distinctive because of its extreme sensitivity to the lower end of the spectrum, which consists of the invisible ultra-violet, violet and blue rays. It is also partially affected by green and yellow light. Its speed as rated by the "scheiner" system is approximately 17 degrees in daylight and 13 degrees in artificial light. When used in conjunction with a Weston meter a factor of 12 is allowed for daylight and 4 in Mazda light.

The grain of regular film is unusually fine and enlargements many times the original size of the negative may be made without the appearance of unpleasant grain.

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Due to its low color sensitivity regular film falls into the high contrast or short scale class of emulsions. This property is valuable in photographing subjects with little contrast. The latitude of regular film is good although not as wide as is possible with orthochromatic emulsions. For general subjects, where absolute color correction is not entirely essential, regular film may be used to advantage. It also serves ideally for copies where a little extra contrast is desired.

With regular film it is almost impossible to record clouds without the use of a filter. Its extreme sensitivity to blue and ultraviolet rays permits the blue sky to register as strongly as the white clouds. Actually, however, the blue should be rendered as gray, its tone depending on the depth and color of the sky. For this reason a sky filter should be used when clouds are present so that the sky may register properly in its relative brightness value. The white clouds will thus be rendered against a gray sky. The exposure should not be increased when using a sky filter. A fair general overall correction may be secured with the aid of a yellow filter such as one of the series of Wratten "K's." The K-1 filter, a pale yellow, gives slight correction and should be used where short exposure is to be preferred to good correction. The K-1½ filter gives a better rendition but requires a greater increase in exposure. The best possible correction on regular film may be secured with the help of the K-2 filter. Since yellow filters hold back a large amount of the light to which regular films are sensitive, exposure must be considerably increased. The factors for regular film when used with the filters mentioned are: K-1, 3½ times; K-1½, 6 times; K-2, 8 times.

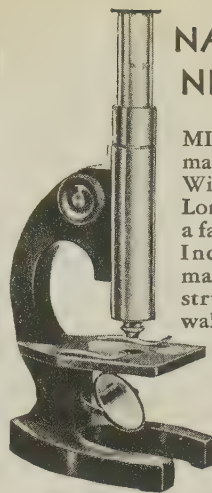
Trade Hints and New Books

How To Take Better Winter Snapshots Night and Day is a well illustrated and valuable pamphlet that will make our winter's activities more interesting. What film to use, effective lighting methods, exposure data, silhouette making, table top photography, and many other subjects are treated in detail. The Agfa Ansco Corporation has courteously made this booklet available to our readers and requests should be addressed to this department. Please send a stamped self-addressed envelope.

The current interest in infra-red photography, to a great extent, is due to the many uses that have been found for it. Photomicrography, chemistry, medicine and biology, to mention only a few, are some of the sciences that have benefited through the development of infra-red photography, and new uses are being found for it almost daily. The Agfa infra-red film is recognized as being one of the outstanding emulsions available for infra-red photography and further information regarding its applications and directions for use is obtainable from the Agfa Ansco Corporation, Binghamton, N. Y.

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three new items to their long list of useful photographic accessories. An acid and alkali proof tray made of bakelite, $4\frac{1}{2}$ " x $6\frac{1}{2}$ " x $1\frac{1}{2}$ ", sells for only 25 cents. A useful darkroom accessory is the new Luxor Timer which ticks off the seconds for timing enlargements while minute and hour hands keep time for tank development. The latest idea in safelights is a ruby or amber bulb and an outer globe of the same color which gives the maximum amount of safe illumination. Further information concerning these items is available from the above company.

The Studio Publications, Inc., 381 Fourth Ave., New York, has recently issued two new books of interest to all photographic enthusiasts.

Movie Parade by Paul Rotha is a historic document of the development of the motion picture from the early 1900's to the present. The author has written extensively on the cinema and it is only fitting that he should have produced *Movie Parade*. The book is composed of about 600 "stills" of motion pictures, the earliest of which dates back to 1902 and the latest including many 1936 productions. The three main sections are titled "Films of Fiction", "Films of Fact" and "Avant Garde and Trick Films". Many sub-headings classify the pictures into groups such as "Adventure", "Comedy", "Romance", "Drama", etc. We recommend this book for the photographer's book shelf. Handsomely bound in blue cloth, it is priced at \$3.50.

Modern Photography, 1936-37, is the latest of the "annuals" available to the public and, in this reviewer's opinion, one of the most attractive to date. Fifteen different countries are represented and the 111 illustrations include six outstanding examples of color photography. The pictures are truthfully reproduced and retain the quality of the originals to remarkable degree. One of the greatest contributing factors to better photography is seeing good pictures and we feel that *Modern Photography 1936-37* will go a long way toward benefiting both amateur and professional picture makers alike. Price in cloth binding \$3.50; paper \$2.50.

The photographic department of Nature Magazine is devoted to its readers interested in photography and maintains a service that renders assistance in any photographic problem. You are invited to take advantage of this service. Address all photographic inquiries to Samuel Brown, NATURE MAGAZINE, 1214 Sixteenth St., N. W., Washington, D. C.

Cordially,
Samuel Brown

Photographers' Handbook

An excellent handbook for the beginning amateur photographer has been written by Eleanor King and Wellmer Pessels. It tells the twelve million amateurs in the United States the secret of taking interesting pictures, not from the technical angle but from the artistic angle, and reveals that expensive equipment and technical knowledge are not necessary to obtain results. *You and Your Camera* is available from the publishers, Harper and Brothers, New York, for \$1.75.

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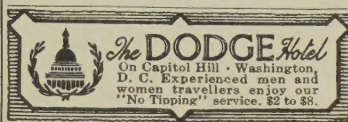
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The booklet contains suggested menus and lists for camping and hiking trip provisioning.

The compilation has been in the making many months under the direction of Ernest A. Dench, Editor of Nature Magazine's Hiking and Camping Forum.

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For Wood Study

In the past we have received numerous inquiries as to where wood specimens could be obtained for study and collection. Our answer has been that so far as we knew it was a matter of making one's own collection. Now comes to hand a fine little wood study kit known by the trade name of KnoWood. It consists of twenty-four small slabs of different woods, each one numbered and related to an accompanying booklet descriptive of the tree, its wood, distribution and uses. The booklet also presents drawings of the leaves, fruit and other essential characteristics of the different trees. The set sells for one dollar, postpaid. It is distributed by the B. F. Springer Company, 404 E. Wisconsin St., Milwaukee, Wisconsin.

Reptiles of North America

After having had to reply to inquirers for several years that *The Reptile Book* by Raymond L. Ditmars is out of print and would have to be ferreted out in a second-hand book store or in the public library, we are happy to announce that it has come to life again. It appears now entitled *The Reptiles of North America*, a completely new and revised edition of the original volume. This invaluable book covers the crocodilians, lizards, snakes, turtles and tortoises inhabiting the United States and northern Mexico. It is illustrated by eight plates in color and more than four hundred photographs in black and white. Dr. Ditmars needs no introduction, of course. He has done a thorough job of revision and included twenty-eight new species of snakes discovered since the publication of *The Reptile Book*. It is also interesting to note that in that period forty-seven lizards and ten turtles have been found to be new species, and many new sub-species have been named. In the past few years superstitions about reptiles and widespread aversion toward them have gradually been breaking down. Their value and interest have become increasingly appreciated. Dr. Ditmars' new edition is much needed. The publishers are Doubleday, Doran and Company and the price of this volume is \$6.75.

Savory Winter Herbs

Savory herbs growing in the garden may be brought indoors for the winter and planted in flower pots or window boxes in a sunny window, says the United States Department of Agriculture, pointing out that it is a great convenience to be able to pick a few savory leaves right in the kitchen.

The best herbs to grow in a window are mint, watercress, parsley, chives, sweet marjoram, basil, and rose geranium. They should be transferred indoors before freezing weather, into a soil consisting of one part sharp sand, one part well-rotted cow manure, and two or three parts of good garden loam. A very small quantity of bone meal may be added. The soil should be mixed thoroughly and screened through a coarse screen.

The window box should be at least 6 inches deep with an inch layer of broken stones on the bottom for drainage. One or two holes in the bottom will drain off surplus water.

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How long should a Man's legs be?

*Lincoln had a good answer.
"Long enough," he drawled,
"to reach from his body to
the ground."*

THAT seems like a good rule to apply to a business. It ought to be big enough to do the job it is intended to do.

Have you ever thought about the size of a company—what makes it big or small?

It isn't the directors and it isn't the stockholders—but the public. No business grows, and keeps on growing, unless it meets the people's needs and renders a worthwhile service at a fair price.

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BELL TELEPHONE SYSTEM

DURING the lengthening evenings of November, those who make their excursions to the out-of-doors transported from their easy chairs through the magic of print may take particular delight this year in the works of one who completes his three-score-years-and-ten on the twenty-fifth of the month, in the midst of a life work that will constitute an unequaled bequest to those who may wish to read about North American birds. Such readers who are most favored by fortune may take from their own library shelves a series of nine volumes written by Arthur Cleveland Bent, of Taunton, Massachusetts, and published by the Smithsonian Institution, that unique benefactor of all who prize knowledge. Others, less fortunate, may have to seek out some public library or some friendly ornithologist, but their search will have the excitement of a quest and may happily result in the sort of satisfaction that will make difficulties in retrospect seem adventure, in any sort of stormy November weather.

Nearly two dozen years ago, *The Auk* for January 1913 reported that "for over twenty years Mr. Bent has devoted his spare time to visiting various points of ornithological interest in North America for the purpose of collecting information, photographs and specimens necessary for an extensive work on the breeding habits of North American birds." During this time, said *The Auk*, Mr. Bent had visited "both northern and southern Labrador, Newfoundland, all the Atlantic and Gulf States from Maine to Louisiana, many of the inland States, and the Pacific coast from Puget Sound to northern Alaska, including the Aleutian Islands," and he had made a "more or less extensive field acquaintance with over 500 different birds" and had accumulated "a large amount of notes, photographs and other material, which forms the basis for his personal contribution to the work." Through the years Mr. Bent's "personal contribution" has continued, and in addition he has marshaled the ornithological observers of the continent, sprinkling his histories with extensive quotations from the cream of their writings, and from the incomparable files of the U. S. Biological Survey.

Starting at the beginning of the check-list of birds arranged in their scientific order, the first volume of the resulting work was published in 1919 with the title *Life Histories of North American Diving Birds*. Two years later the second volume, *Gulls and Terns*, appeared; and Witmer Stone, reviewing it in *The Auk* for January 1922, phrased a characterization of the entire series in his comment that it "will be a work of reference which must needs be constantly within reach of every ornithologist, be he writer or editor, field naturalist or museum curator." The volume on *Petrels and Pelicans and Their Allies* followed in 1922. Two volumes on *Waterfowl* appeared in 1923 and 1925; the *Marsh Birds* in 1926; the *Shore Birds* in two volumes in 1927 and 1929; and *Gallinaceous Birds* in 1932. Then the Smithsonian Institution's publishing program was drastically curtailed. Mr. Bent, however, has completed two more volumes, on the

birds of prey, now pending publication, and he is at work on the twelfth volume, dealing with the birds in the check list from parrots to and including hummingbirds. Having presented his readers with this volume, Mr. Bent will have completed the task that he long ago undertook, and to which he has faithfully devoted his time, talents, and resources; left for the future will be another dozen or so volumes on the perching birds—most numerous order of North American birds, including the flycatchers, the warblers, and nearly all of the beautiful small species that the bird lover calls songsters. Considering Mr. Bent's magnificent accomplishment and example the hopeful reader can only challenge: "Who follows in his train?"

With the story of Bent's great work on birds, one has said enough to congratulate a man for three score and ten years well spent. Yet a glance at "Who's Who" will show that these years have also included an eminent service to an industrial age, and those who have rightly feared that our concern with machinery and bookkeeping may make it difficult for us to see much "in Nature that is ours" will note an encouraging significance in the fact that this man, who was for many years general manager of a machine works and president of an electric light company, has produced one of the Century's most useful works on birds. It seems peculiarly significant that this retired business leader is now president of the American Ornithologists' Union.

Although Mr. Bent's life histories of birds constitute an invaluable reference work, these are no dryly compiled treatises of only factual interest. The author's production shows not only an intellectual interest in truth but also a sensitive feeling for beauty and a sympathetic attitude toward the creatures of the wild. "There can be no doubt," he writes, for instance, "that the modern sport of camera-hunting is rapidly increasing in favor and gradually replacing the more destructive, though no more exciting, sport of killing game. . . . Though my early training and my field experience in the best shooting-grounds in the country have made me an ardent sportsman, I shall in future leave the killing of game to others—to those who have not tasted of the pleasure of bird photography." And these words were not based on our recent alarming decrease of game; they were written for *Bird-Lore* of May-June 1909.

Thus, no more delightful November browsing can be suggested to the reader on the out-of-doors than that to be enjoyed in turning the leaves of Mr. Bent's nine volumes of life histories. And if, perchance, it should happen that any lover of the out-of-doors on the eve of Thanksgiving this year should be searching his mind for thought of something for which to be especially thankful, may he join us in remembering that November 25, 1936, is the seventieth anniversary of the birth of Arthur Cleveland Bent, whose contribution to the knowledge and pleasure of all readers on bird life merits the deepest gratitude, and best wishes for many more seasons with the birds!

BO-BO IN A VARIETY OF POSES AS
 CAUGHT BY THE PENCIL OF THE
 AUTHOR-ARTIST . . . FIRST HE
 PERCHES SMUGLY ON A FRIENDLY
 HAND ON THAT FIRST DAY WHEN
 HE JOINED THE FAMILY AS A
 FLEDGLING . . . THEN, AFTER TWO
 MONTHS, HE TOOK ON ADDED
 WEIGHT, FEATHERS AND DIGNITY
 . . . FULL-FEATHERED, HE DELIGHT-
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